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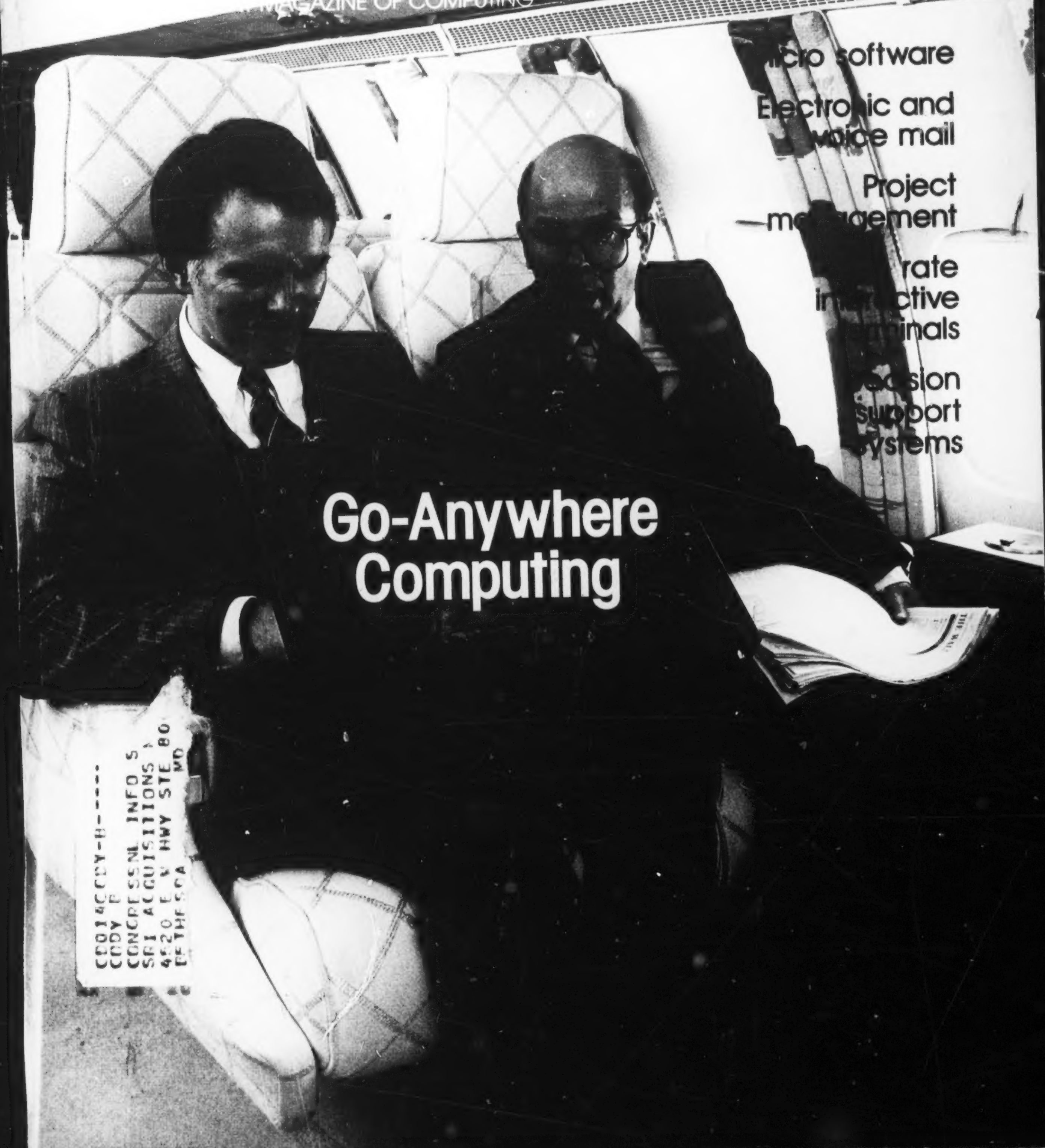

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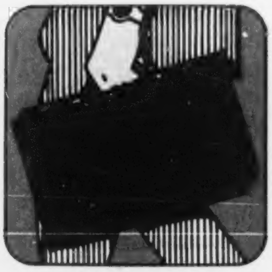

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COVER PHOTO: Rick Barrick

Users Rate Interactive Terminals

A new survey suggests that managers are sacrificing ergonomics and special features on the terminals they buy to get good vendor service.

by John J. Hunter, Data Decisions Inc.

Terminals are a dilemma for computer managers: Buying models with productivity-raising ergonomic features often means sacrificing optimum service from vendors. Service and reliability, in the minds of managers, are of paramount importance. Thus, a survey of 50 widely used interactive terminals earlier this year suggests that forgoing "hot" features to get good service has become a way of life for managers.

Managers were asked to rate their terminals for overall performance; reliability and vendor support; ergonomics; and display, editing, and formatting features. The top finishers in the ergonomics and display-features categories generally didn't score as well in the vendor-service poll. Take the Decision Data 3751. It was rated best by respondents for display and ergonomic features. However, the Decision Data 3751 ranked 30th in terms of reliability and vendor support.

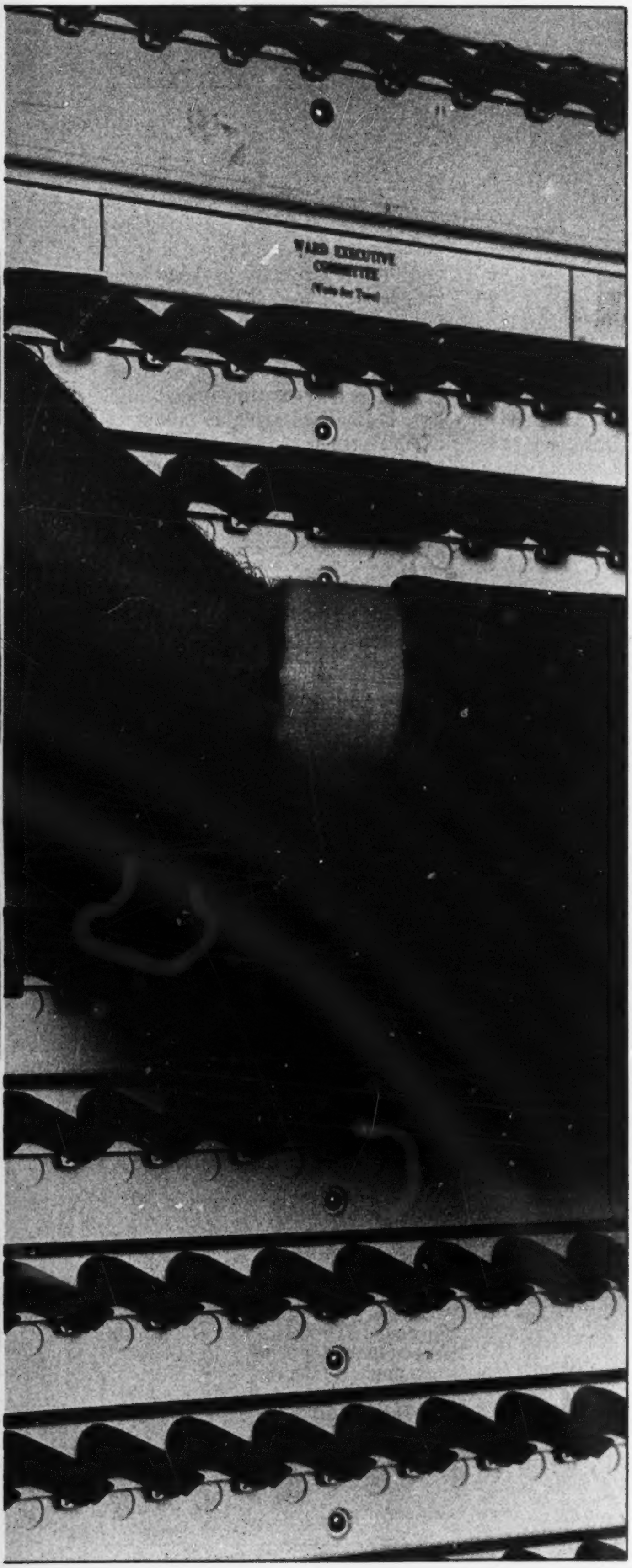
On the other hand, Hewlett-Packard's Models 2624 and 2622 ranked first and second, respectively, in the reliability/vendor-support poll. However, the two terminals ranked 17th and 11th in the ergonomics survey. The models fared a little better in the ranking on display, editing, and formatting features, finishing third and sixth, respectively.

How important are vendor support and reliability to managers? When asked to name the criteria they used to choose a particular terminal, half of the respondents said a vendor's reliability and reputation were "very important" factors. When asked for their single most important criterion, vendor reliability finished third, behind compatibility with existing equipment (a predictable answer) and price. Thirty-three percent said compatibility was their most important selection criterion. Price was most important to 12 percent of the respondents.

Given the importance managers assign to vendor service, the vendor-support poll might be considered a good indication of the respondents' preferences. The top five

REPRESENTATIVE IN GENERAL ASSEMBLY
175TH DISTRICT
(Vote for One)
MEMBER OF THE STATE COMMITTEE
FOURTH DISTRICT
(Vote for Two)
ONE MAN
ONE WOMAN

Photo by H. Armstrong Roberts



finishers in the vendor-support poll were the HP Models 2624, 2622, and 2640; the IBM 3278, and the HP 2621. The overall-performance rating also can be considered a good indication of managers' opinions. In it, the HP 2624, the HP 2626, the Televideo 925, the DEC VT100, and Televideo's 950 achieved the top five average scores. (See the accompanying charts for the top finishers in the other categories.)

These findings are based on the responses of 2,275 data-processing and other computer-involved managers. They were asked to rate their machines in the four categories, describe which activities their terminals are used for, and project how they expect to use terminals in the future. Generally, managers rate the terminals they've deployed as being "very good." Nineteen percent said they'd reorder terminals from their current vendor. Sixty-four percent believe their terminals have no limitations.

The survey has a definite management perspective, as indicated by the high marks most of the terminals received and the emphasis on vendor support. After all, most of the managers surveyed don't use the terminals. Data-entry professionals would probably place a heavier emphasis on ergonomics and special features if they had a voice in terminal purchasing.

Because the rankings are uniformly high for all categories—no terminal received a mark lower than 4.5 on a scale of 10—the survey has the appearance of a popularity contest among machines that are all popular anyway. None of the 50 terminals received the lowest rating ("inadequate"), and only three were rated as being less than "very good" in the important vendor-support survey. Those three were the Lear Siegler ADM-1 (which is no longer manufactured), the Burroughs TD/700, and the Raytheon PTS 100. Nevertheless, the survey results point to several interesting trends and some unexpected conclusions about managers' perception of their terminals.

Taking ergonomics for granted

The low priority managers gave good ergonomics was the survey's most unexpected result. Poor ergonomics, or designs that fail to accommodate the physical needs of users, have been singled out as the major cause of eyestrain, fatigue, and other work-related physical maladies among data-entry workers. Some experts blame low productivity on these biotechnological problems. Some vendors have incorporated features like tilting screens and tinted glass into their new models, promising to keep operators working in ergonomic harmony with their machines.

Among data-entry professionals, ergonomics has become a mantra. For managers, ergonomics could be meaningful because of its impact on productivity, but it was mentioned by so few managers on the purchasing-criteria question that it didn't even make the final list of nine features. Fewer than 1 percent of the managers listed good ergonomic qualities as a purchasing criterion.

Does this mean managers don't care about their operators or are indifferent to the importance of ergonomics? We don't think so. Rather, it appears that most managers *expect* the terminals they buy to have good ergonomic qualities. This conclusion is supported by another part of the survey: A majority of the respondents rated the terminals used at their sites as being "very good" (between

Interactive Terminals

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6 and 8 on a scale of 10) in eight ergonomic classifications. Considering that many of the terminals were designed during the mid-1970s, before the impact of good ergonomics on productivity was widely recognized, we were surprised they scored so well. The average scores follow.

Keyboard layout	6.8
Feel of keys	6.8
Low keyboard/printer noise level	6.7
Numeric/control key layout	6.7
Screen position	6.4
Lack of keyboard-user fatigue	6.2
Lack of screen-user fatigue	6.0
Ease of adjustment	6.0

Management sensitivity to the issue is also evident in the low scores some respondents gave their terminals in this poll, as indicated by high-low comparisons. Ratings for keyboard layout, for instance, range from 7.8 to 5.2. The bottom end of the range corresponds to a rating of "acceptable," a low score in the context of this survey. The range for feel of keyboard is 8.0 to 4.5; for noise level, it is 7.8 to 5.3; and for numeric/control key layout, it is 8.2 to 5.0. The range for keyboard-user fatigue is 7.1 to 4.4; for screen-user fatigue, it is 7.3 to 4.8; and for ease of adjustment, it is 8.0 to 4.6.

Like ergonomic designs, data-editing and formatting capabilities have been linked to higher productivity. Nevertheless, these features also landed near the bottom of the purchasing-priorities list. On another question, only 2.8 percent of the man-

Overall performance

Hewlett-Packard 2626	8.0
Hewlett-Packard 2624	8.0
Televideo 925	8.0
DEC VT100	7.9
Televideo 950	7.9
Hewlett-Packard 2622	7.7
IBM 3279	7.7
Decision Data 3751	7.6
IBM 3276	7.6
Sperry UTS 20	7.6
Wang 2236	7.6
Hewlett-Packard 2645	7.5
Datapoint 8200	7.4
IBM 3270	7.4
IBM 3278	7.4
Telex 277	7.4
Texas Instruments 911	7.4
Hewlett-Packard 2640	7.3
Honeywell VIP 7800	7.3
Televideo 910	7.3
Televideo 912	7.3
Memorex 1377	7.2
Teletype 40	7.2
Telex 278	7.2
Data General D200	7.1
NCR 7900	7.1
Honeywell VIP 7200	7.0
ADDS Viewpoint	6.9
Hewlett-Packard 2621	6.9
IBM 3101	6.9
IBM 3275	6.9
ADDS Regent 40	6.8
Lear Siegler ADM-31	6.8
Televideo 920	6.8
ADDS Regent 100	6.5
Lear Siegler ADM-2	6.5
Lear Siegler ADM-3	6.3
ADDS Regent 25	6.2
Hazeltine Module One (Now made by Esprit)	6.2
Microdata Prism	6.2
Sperry Uniscope 100	6.2
Burroughs TD/800	6.1
Honeywell VIP 7700	6.1
Raytheon PTS 100	6.1
Soroc IQ120	6.1
IBM 3277	5.9
NCR 796	5.9
Sperry Uniscope 200	5.9
Lear Siegler ADM-1	5.4
Burroughs TD/700	5.1

9-10: Superior; 6-8: Very good; 3-5: Acceptable; 1-2: Inadequate. Average for terminals studied: 7.0.

Reliability and vendor support

Hewlett-Packard 2624	8.7
Hewlett-Packard 2622	8.3
Hewlett-Packard 2640	8.3
IBM 3278	8.3
Hewlett-Packard 2621	8.2
Hewlett-Packard 2626	8.2
IBM 3276	8.2
IBM 3279	8.2
DEC VT100	8.1
Hewlett-Packard 2645	8.1
IBM 3270	8.1
Datapoint 8200	8.0
Data General D200	7.9
Honeywell VIP 7200	7.8
Wang 2236	7.8
NCR 7900	7.7
Sperry UTS 20	7.7
Televideo 910	7.5
Televideo 925	7.5
Honeywell VIP 7800	7.4
IBM 3275	7.4
IBM 3277	7.4
Telex 278	7.4
Telex 277	7.3
Texas Instruments 911	7.3
Honeywell VIP 7700	7.2
IBM 3101	7.2
Televideo 912	7.2
Televideo 950	7.2
Decision Data 3751	7.1
Microdata Prism	7.1
Teletype 40	7.0
ADDS Viewpoint	6.9
NCR 796	6.9
Memorex 1377	6.8
ADDS Regent 40	6.7
Lear Siegler ADM-3	6.7
Sperry Uniscope 100	6.7
Sperry Uniscope 200	6.6
Lear Siegler ADM-31	6.5
Televideo 920	6.5
ADDS Regent 25	6.3
ADDS Regent 100	6.3
Burroughs TD/800	6.2
Hazeltine Module One (Now made by Esprit)	6.2
Soroc IQ120	6.2
Lear Siegler ADM-2	6.0
Raytheon PTS 100	5.8
Burroughs TD/700	5.5
Lear Siegler ADM-1	5.4

9-10: Superior; 6-8: Very good; 3-5: Acceptable; 1-2: Inadequate. Average for terminals studied: 7.3.

(Continued from page 204)

agers listed inadequate editing and formatting features as a limitation of their organizations' terminals.

Data editing is the ability to change displays either through the terminal or remotely through the host processor. Adding and deleting characters are typical editing functions. Formatting capabilities usually include designating certain fields in a display as alphabetic or numeric only, protecting certain fields from alteration, and requiring that data be presented in a particular format.

Another unexpected result was the popularity of the nine old or discontinued terminals in the survey. From a strictly operational standpoint, the old terminals scored fairly well. For example, on the overall-performance scale, the Datapoint 8200, predecessor of the Model 8220, finished 12th, and Honeywell's VIP 7800 (replaced by the 7801) finished 16th. The Datapoint machine was rated *second* for ergonomics.

Datapoint's scores were unusually high among the older terminals. Most of the older models fell in the middle of the pack in the ratings for overall performance, display and editing features, and ergonomics. They scored lower in the reliability/vendor-support poll. Nonetheless, order of finish isn't everything in these polls: The majority of the older machines received high marks. Apparently, the enhancements offered by new models are not as important to managers as the core functions provided by earlier designs. The other machines that have been replaced by newer models are the ADDS Regent series, superseded by the Viewpoint; the Honeywell VIP 7700, which was replaced

Ergonomics

Decision Data 3751	7.6
Datapoint 8200	7.1
Sperry UTS 20	7.1
Televideo 925	7.1
Memorex 1377	7.0
DEC VT100	6.9
Hewlett-Packard 2626	6.9
Televideo 950	6.9
Texas Instruments 911	6.9
Data General D200	6.8
Hewlett-Packard 2622	6.8
IBM 3101	6.8
IBM 3270	6.8
Televideo 910	6.8
Telex 277	6.8
Wang 2236	6.8
Hewlett-Packard 2624	6.7
IBM 3279	6.7
Televideo 912	6.7
Hewlett-Packard 2645	6.6
Honeywell VIP 7200	6.6
Honeywell VIP 7800	6.6
NCR 7900	6.6
ADDS Regent 40	6.5
IBM 3276	6.5
ADDS Viewpoint	6.4
Telex 278	6.4
Hewlett-Packard 2640	6.3
IBM 3278	6.3
Microdata Prism	6.3
ADDS Regent 25	6.2
Hazeltine Module One (Now made by Esprit)	6.2
Sperry Uniscope 100	6.2
Teletype 40	6.2
Televideo 920	6.2
Lear Siegler ADM-31	6.1
Hewlett-Packard 2621	6.0
IBM 3275	6.0
Raytheon PTS 100	6.0
ADDS Regent 100	5.9
Lear Siegler ADM-2	5.9
Lear Siegler ADM-3	5.8
Sperry Uniscope 200	5.8
Burroughs TD/700	5.7
Honeywell VIP 7700	5.7
Soroc IQ120	5.6
NCR 796	5.5
Burroughs TD/800	5.4
IBM 3277	5.4
Lear Siegler ADM-1	4.9

9-10: Superior; 6-8: Very good; 3-5: Acceptable; 1-2: Inadequate. Average for terminals studied: 6.4.

Display and editing/formatting features

Decision Data 3751	7.6
Hewlett-Packard 2626	7.4
Hewlett-Packard 2624	7.3
Televideo 950	7.2
Texas Instruments 911	7.2
Hewlett-Packard 2622	7.1
Wang 2236	7.1
Sperry UTS 20	7.0
Teletype 40	7.0
Televideo 925	7.0
IBM 3270	6.9
Hewlett-Packard 2645	6.8
IBM 3279	6.8
Televideo 910	6.8
Telex 277	6.8
Data General D200	6.7
Hewlett-Packard 2640	6.7
Honeywell VIP 7800	6.7
IBM 3276	6.6
Memorex 1377	6.6
Telex 278	6.6
Datapoint 8200	6.5
DEC VT100	6.5
Honeywell VIP 7200	6.4
IBM 3278	6.4
ADDS Regent 40	6.3
IBM 3101	6.2
Lear Siegler ADM-2	6.2
NCR 7900	6.2
Televideo 912	6.2
Raytheon PTS 100	6.1
Televideo 920	6.1
ADDS Viewpoint	6.0
IBM 3275	6.0
Hewlett-Packard 2621	5.9
Lear Siegler ADM-31	5.8
Sperry Uniscope 200	5.8
ADDS Regent 100	5.7
Burroughs TD/800	5.7
Hazeltine Module One (Now made by Esprit)	5.6
Microdata Prism	5.6
Sperry Uniscope 100	5.6
ADDS Regent 25	5.5
IBM 3277	5.3
Honeywell VIP 7700	5.2
Soroc IQ120	5.2
Lear Siegler ADM-3	5.1
NCR 796	5.0
Lear Siegler ADM-1	4.8
Burroughs TD/700	4.5

9-10: Superior; 6-8: Very good; 3-5: Acceptable; 1-2: Inadequate. Average for terminals studied: 6.4.

(Continued from page 206)

by the 7710 and the 7740; Soroc's IQ120, replaced by the Challenger 50; and Lear Siegler Models ADM-1 and ADM-2, replaced by the ADM-31 and the ADM-42, respectively.

The Ferrari and the Chevy

System designers and vendors generally believe faster response times raise productivity, helping user companies achieve greater profits. Many maintain that the cluster controllers and data-transmission lines in use are entirely too slow to support "acceptable" response times. The managers in the survey disagree. Respondents reported no significant problems with response time, either in cluster, or networked, arrangements or in line communications between stand-alone terminals.

A 15-terminal cluster with a normal load of transactions and a 9,600-bps transmission line responds to user queries within 2 to 4 seconds. IBM, which is emphasizing subsecond response times in its new offerings, believes this range is too slow. But to the managers who responded to the survey, the issue of transmission speed is analogous to the choice between buying a Ferrari and a Chevrolet. Many of the managers are happy with their practical Chevys, thank you.

The average cluster controller in the responding user organizations controls 11 terminals in a network. For example, IBM 3270 clusters averaged 11 Model 3277 or 3279 terminals; those using 3278 terminals averaged 27 per cluster.

At the surveyed user sites, two of three terminals are used as single-station stand-alones. That's not surprising, but some of the other results have interesting implications.

Some 77 percent of the respondents use terminals connected locally via coaxial cable or twisted-pair wiring. Thirty-four percent use private or leased telephone lines. Only 15 percent of the respondents said they had remote terminals connected via dialup telephone lines. These statistics suggest that managers are paying a high price for data communications.

The coaxial cable and twisted-pair wiring used to connect terminals locally are expensive to buy and install between terminal and processor. Multiplexers, which combine transmissions from many slow-speed lines on one high-speed line, could reduce the number of lines required for communications—and cut costs. Multiplexers also enable communications between processors and terminals to take place over greater distances.

Terminals at surveyed sites are most commonly operated at a trans-

---

The primary objective of this research was to measure users' perceptions of 50 widely used interactive terminals. For each terminal identified as being used at more than 100 installations, a sample of 100 sites was chosen. For those used at 100 or fewer sites, the sample included all known sites. The samples were chosen from a list of installations maintained by Computer Intelligence Corp., La Jolla, CA.

The survey began on June 6, 1983, when 4,999 questionnaires were mailed to users of the 50 terminals at 4,337 sites. Questionnaires were addressed to a specific manager at each site, most commonly the data-processing manager. The mailing included a $1 incentive and a post-paid envelope. Only one mailing was made. The survey questionnaire asked the following questions about terminal usage.

- *How many units are used as stand-alones; how many are used in cluster systems?*
- *For which functions is the terminal used? Is it connected locally and/or remotely for each function?*
- *For which functions is the terminal expected to be used in the future? Will it be used with local and/or remote connections for each function?*
- *Which factors were involved in your decision to acquire your organization's terminals? What were their relative importance?*
- *Have you encountered any limitations?*
- *Will you acquire the same terminal if additional units are needed?*
- *In which communications environment does the terminal operate, and at which transmission speeds?*

Managers were also asked to rate their organization's terminals on a scale of 1 to 10 for ergonomic qualities; display features, data editing/formatting features; system reliability, quality and timeliness of vendor and/or third-party support; and overall performance. The 10-point scale also included verbal values. One-2 was "inadequate," 3-5 was "acceptable," 6-8 was "very good," and 9-10 was "superior."

When the survey was closed on July 6, 2,816 questionnaires from 2,450 sites had been received, a response rate of 56 percent. Twelve questionnaires were returned as undeliverable. Five hundred forty-one respondents said they were not using one of the terminals under study, and they were removed from the tabulations.

The findings presented in this article reflect the particular dimensions probed in the survey. They are not intended to be all-inclusive, and the ratings are not necessarily comparable to results that would have been obtained from a controlled engineering test or experiment. A terminal's average score on a specific criterion is based on all managers who offered a rating. The managers who said the criterion did not apply to their terminals, or who simply did not rate their terminals in a particular category, are not reflected in the average score.

As in all sample surveys, the results are estimates within a range of what would have been obtained if all members of the universe were surveyed. The margins of sampling variation, or tolerances, applicable to the ratings of individual aspects of terminal performance are as follows. (They include a 68 percent confidence level.)

	5.0 or under	6.0	7.0	8.0 or under
Sample size				
55 and over	.40	.30	.25	.20
50-54	.40	.30	.25	.25
40-49	.40	.30	.30	.25
under 40	.40	.35	.35	.30

This means that the chances are approximately two in three that a reported rating differs by no more than the indicated tolerance from the rating that would have been obtained if all eligible sites had been surveyed. For example, suppose a sample of 50 sites gives a terminal a rating of 7.0 on a specific attribute. The table indicates a tolerance of .25. Thus, the chances are two in three that the range 6.75-7.25 will include the rating that would have been obtained if all eligible sites had been surveyed.

The material in this article is based on a survey conducted under the direction of Data Decisions Inc., a research and consulting firm that publishes information on computer systems, communications systems, and software. The full report (Report P116-AL), which provides detailed statistics on each terminal, is available for $29 from Data Decisions, 20 Brace Rd., Cherry Hill, NJ 08034, (609) 429-7100.

Interactive Terminals

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mission speed of 9,600 bits per second (at 47 percent of the user sites). Twenty-one percent of the respondents operate at 4,800 bps, 20 percent operate at 2,400, and 20 percent operate at 1,200 bps. In these communications setups, response times are generally quick. Thus, most of the respondents don't need speed-up features like block- and page-mode. Also, most managers aren't impressed with the ability of block- and page-mode features to accelerate the line-at-a-time transmission speeds of terminals. Only 1 percent of the respondents listed the absence of block-mode as one of their terminals' liabilities.

The ability of terminals to be modified to handle graphics and personal-computing capabilities seems destined to become an important factor in future purchasing decisions. At the sites surveyed, most of the terminals are being used for the bread-and-butter chores of inquiry/update (90 percent), data entry (84 percent), and program development (70 percent). However, when users were asked to forecast their needs over the next five years, they predicted that their need for graphics and personal-computing capabilities would rise by about 10 percent each. Six percent of the sites currently run graphics on their terminals; 10 percent have personal-computing enhancements. By 1988, inquiry/update and data entry will fall about 10 percent each and program development will drop about 5 percent, the respondents said.

> "Half of the respondents listed vendor reputation and reliability as very important factors in selection of terminals."

There doesn't seem to be any correlation between the decline of one activity and the increase of another, but the importance of personal computing and graphics points to a small but steady shift in the orientation of user companies. Business graphics and personal computing are the domain of management—a group that has traditionally resisted using terminals.

Will more managers use terminals in the future? Can this change be attributed to the widespread acceptance among managers of microcomputers? Maybe. For the moment, it means that terminals that can't be upgraded probably won't be acceptable to many managers. Of the terminals surveyed, only those offered by Digital Equipment Corp. (DEC) and IBM offer intelligent upgrades.

The terminals surveyed are not only good, they don't have a single limitation, according to almost two-thirds of the respondents. We aren't surprised by this result. After all, the terminals were most likely purchased by the respondents, who naturally believe they made good selections. Also, most of the organizations surveyed use terminals for the simple applications of inquiry/update and data entry. However, managers listed a few complaints.

Incompatibility with other computer systems headed the list of limitations with a measly 6 percent of the respondents. Obviously, a terminal that's incompatible with an existing system is a problem. But compatibility also often refers to how a terminal "fits into" an operation.

Other limitations included limited expandability, poor keyboard layout, lack of special-function keys, limited editing and formatting capabilities, and age. Each of these factors was mentioned by a relatively insignificant number of managers, however. All in all, the managers believe the advantages offered by their terminals outweigh their limitations. ☐

John J. Hunter is a senior editor/analyst with Data Decisions Inc., Cherry Hill, NJ.

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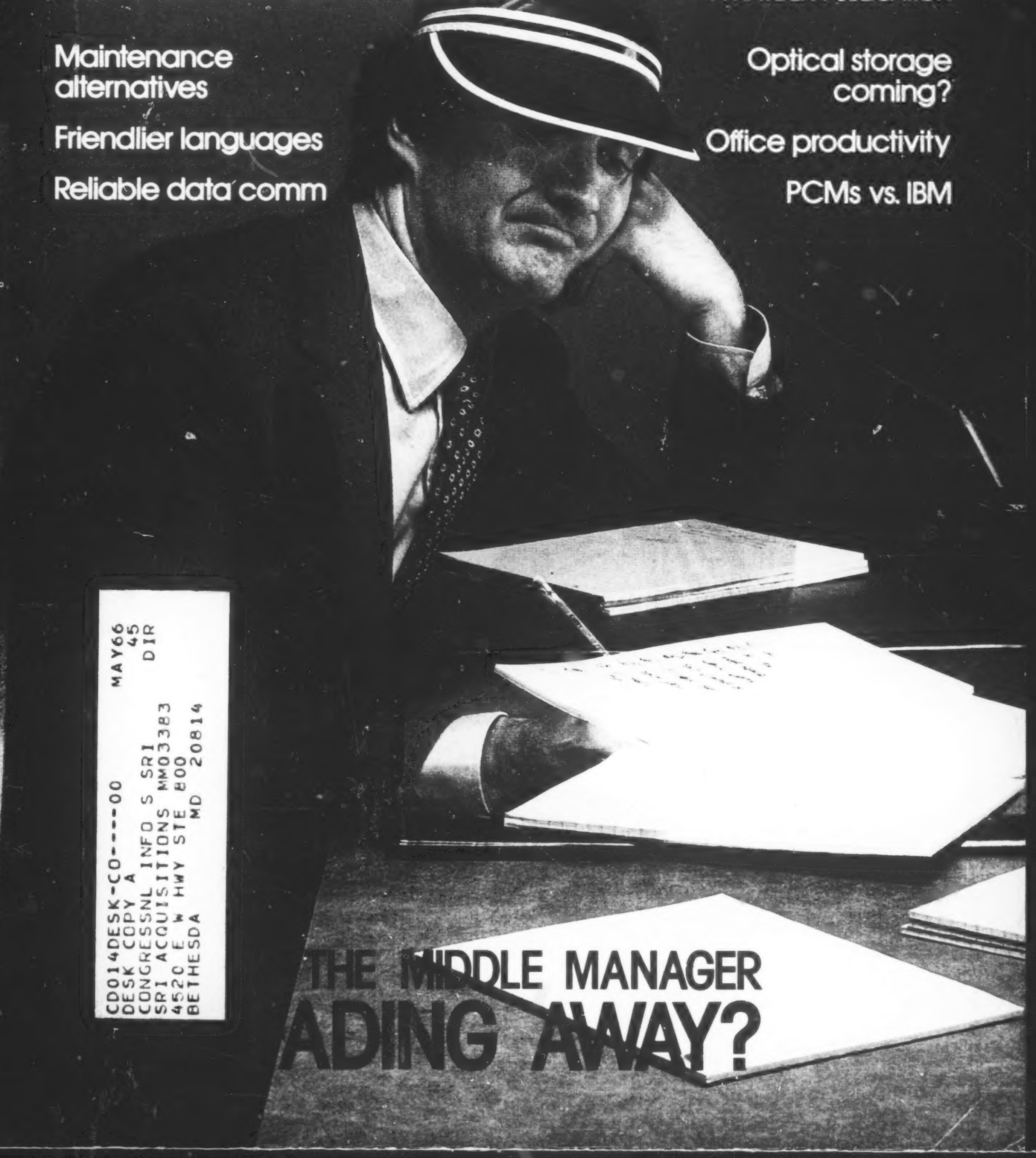

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THE MIDDLE MANAGER ADING AWAY?

COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING
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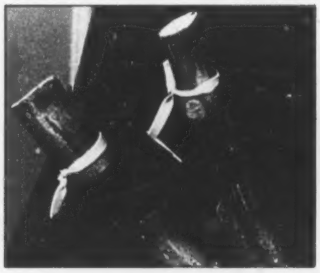

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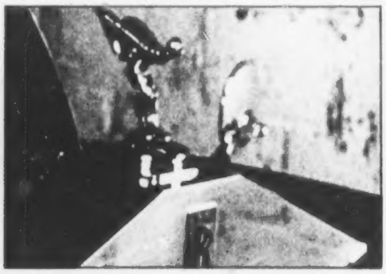

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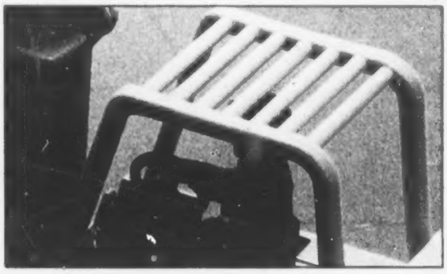

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COVER PHOTO: Bill Oliwa

OFFICE AUTOMATION

And the race goes on—Part I

The proliferation of office-automation vendors, coupled with an aggressive marketing climate, is probably only adding to your confusion about choosing a primary supplier of hardware. Indeed, potential users are being bombarded by relentless marketing teams that, quite obviously, are more than willing to demonstrate how much better their "bells and whistles" are than the competition's offerings. Which one of these eager-to-please suitors should you choose? Your choice depends on a variety of criteria. But one important question to consider in the decision-making process—perhaps the *most* important—is: Will the vendor be available to service its equipment in the years to come? Or, more to the point: Will the vendor be able to survive in the increasingly competitive climate?

Last year, recognizing just how important consideration of this question is, *Computer Decisions* surveyed 75 office-automation consultants and managers of OA projects about the survivability of well-known vendors. Twenty-two experts responded. Results were published in the January and February 1983 issues.

The focus of the survey was five years into the future—early 1988. Each respondent was asked to check one of three ratings for each vendor named (there were 34 vendors in all). The choice of ratings included "sure survivor," "likely survivor," and "not likely." In tallying results, a "weight" of 10 was assigned to each "sure survivor" vote, 6 to each "likely survivor" vote, and 2 to each "not likely." The highest possible score any vendor could attain was 220. However, no vendor received that score because not all respondents rated every vendor.

This year, the process was repeated, focusing on 38 vendors in the year 1989. In cooperation with the Office Automation Society International, we surveyed its members, and received a total of 36 responses by the September 15 deadline, in comparison to last year's 22. Also like last year's survey, this year's covered two separate categories. This month, we're presenting results on vendors supplying Fortune 1,000 organizations. We'll give a similar report in next month's issue, covering the major suppliers to single-site operations.

The chart that accompanies this report provides total scores for each vendor, as well as the number of "sure survivor" votes each received. The chart also compares current scores for each company with last year's scores. The highest possible rating any vendor could receive this year was 360. As in last year's survey, no vendor received a perfect score because not all respondents rated every vendor.

As in last year's survey, no vendor got a perfect score, because not all respondents rated every vendor.

The "Top 10" roster of vendors was almost completely predictable. In rank order of total scores they are: IBM (342); Digital Equipment (DEC) (298); Wang Laboratories (288); Hewlett-Packard (284); AT&T Information Systems (272); Apple Computer (250); Xerox (244); Honeywell (234); Kodak (220); and Northern Telecom (206).

Again, as in last year's survey, IBM ran away with the race. Thirty-three of the 36 respondents rated Big Blue a "sure survivor."

Digital Equipment moved up from fourth place last year to second. According to some respondents, DEC's entrance into the personal-computer market—although a little late—and its commitment to a more aggressive marketing strategy, were responsible for the quick attainment of its higher standing. Twenty-eight of those surveyed rated DEC a "sure survivor."

Wang Laboratories was nosed out of second place into the third slot by only three "sure survivor" votes—it received 25 notches in that category.

Hewlett-Packard was a "dark horse," as it moved up from sixth place in last year's competition to fourth this year. It garnered 23 "sure survivor" votes and nine "likely survivor" votes, overtaking AT&T Information Systems and Xerox along the way. Although AT&T holds a lower position than in last year's race (it was third), confidence still runs high that it will be a contender five years from now. AT&T received 23 "sure survivor" and seven "likely survivor" votes.

Apple Computer took sixth place, with a total of 16 "sure survivor" votes. At first glance, such a high rating might seem surprising, considering the industry giants surrounding the young contender. However, according to some of the survey respondents, Apple machines have found their niche as executive terminals for staff officers. Thirteen "likely survivor" votes and six "not likely" votes are added to Apple's score.

If the tallies are any indication, respondents have mixed feelings about Xerox. First of all, it dropped from fifth place in last year's race to seventh place. Second, although it collected 18 "sure survivor" votes and 10 "likely survivor," two respondents felt the vendor might not be selling to the Fortune 1,000 in 1989.

Honeywell and Northern Telecom kept their places at the low end of the "Top 10," but a newcomer to the survey—Kodak—managed to squeeze in between the two and claim ninth place. It gathered 16 "sure survivor," nine "likely survivor," and three "not likely" votes.

Perhaps you work for a smaller, single-site company. In that case, you'd probably be more interested in what the experts have to say next month. Stick around. ☐

"Survivor" survey results

Company*	Total score 1989	"Sure survivor" votes 1989	Total score 1988	"Sure survivor" votes 1988
Anaconda-Ericson	74	0	—	—
Anderson Jacobson	124	3	52	1
Apple Computer	250	16	104	5
AT&T Information Systems	272	23	178	16
Bell & Howell	158	5	—	—
Burroughs	196	9	98	0
CPT	120	2	78	0
Data General	196	8	74	0
Datapoint	162	3	82	0
A. B. Dick	124	3	48	1
Dictaphone**	168	7	66	1
Digital Equipment	298	28	172	14
Exxon Office Products	160	8	44	0
Hewlett-Packard	284	23	134	8
Honeywell	234	13	106	2
IBM	342	33	206	20
Kodak	220	16	—	—
Lanier	172	7	90	2
Motorola (Four Phase)	134	6	74	1
NBI	120	4	92	1
NEC	144	9	70	0
Nixdorf	72	1	46	0
Northern Telecom	206	14	102	5
Olivetti	112	3	72	1
Philips (Micom)	110	6	78	0
Prime	152	5	80	2
Raytheon (Lexitron)	88	2	66	0
Rolm	152	8	98	4
Royal	106	3	46	0
Sony	162	8	70	1
Sperry	196	11	84	0
Syntrex	78	1	48	0
Tandem	142	4	80	0
Tandy (Radio Shack)	160	5	70	3
3M	190	12	—	—
Wang	288	25	194	17
Wordplex	60	1	38	0
Xerox	244	18	164	11

*These results show which vendors members of the Office Automation Society International think will be serving the Fortune 1,000 corporations in five years. Vendors that received write-in votes from respondents include CPI, Kaypro, Siemens, and Texas Instruments.

**In October, Dictaphone announced its withdrawal from the word-processing business.

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COMPUTER DECISIONS

JANUARY 1984

THE MANAGEMENT MAGAZINE OF COMPU

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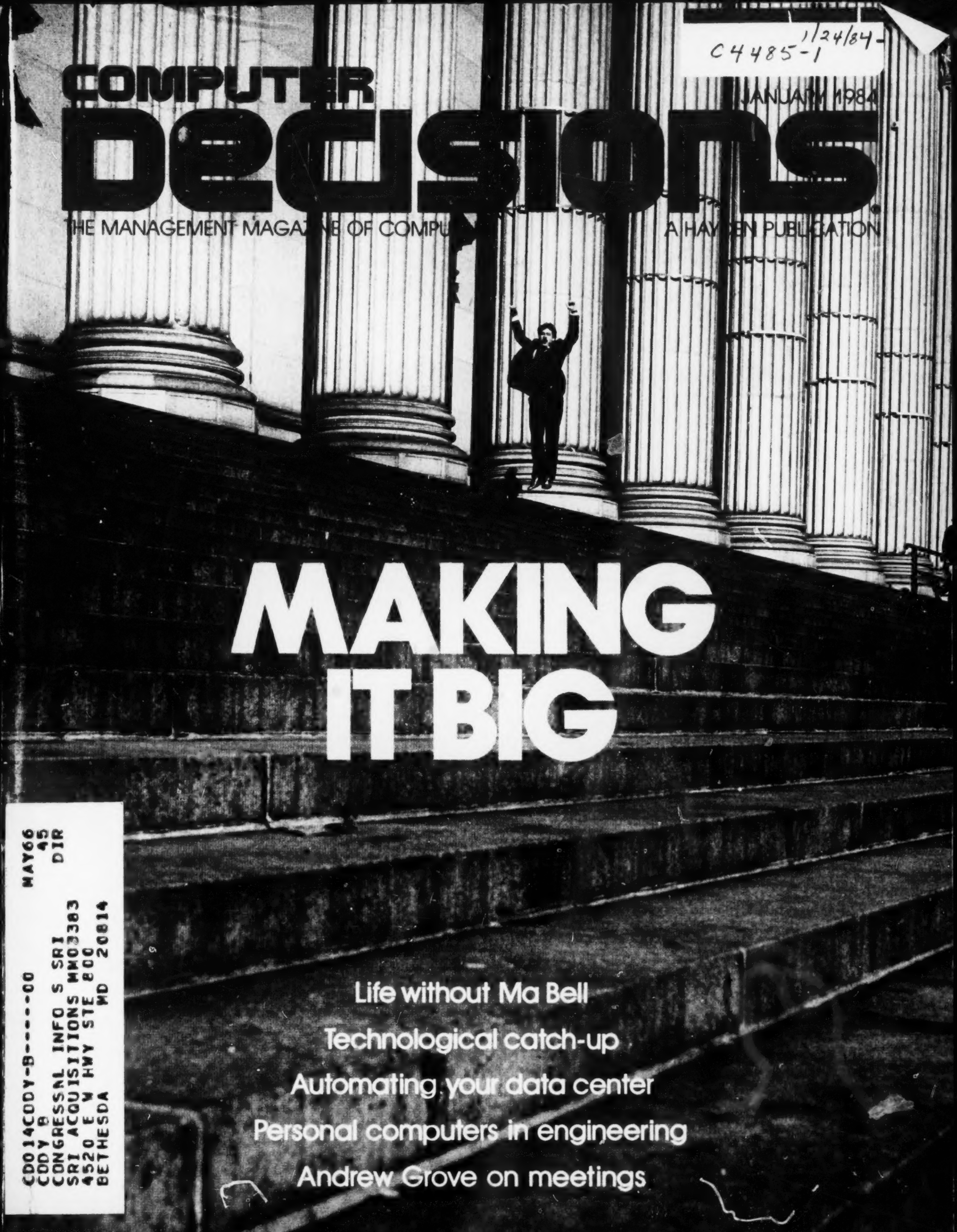

MAKING IT BIG

Life without Ma Bell

Technological catch-up

Automating your data center

Personal computers in engineering

Andrew Grove on meetings

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COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING
JANUARY 1984
Volume 16 Number 1
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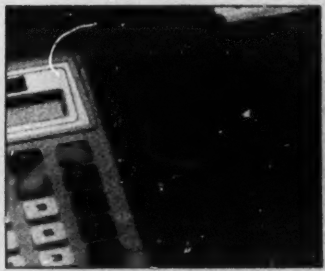

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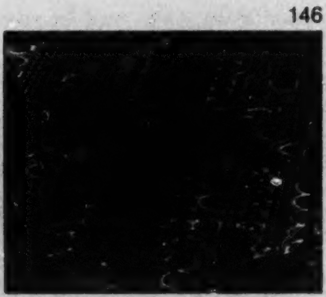

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COVER PHOTO: Edward Hardin

news & comment

Are corporate micros underused?

Are personal computers in corporations being used to capacity? A new survey of managers and employees in Fortune 500 companies suggests that capacity has very different meanings to the two groups.

In the survey, 80 percent of the 100-manager sample said their organizations' personal computers aren't being used to full capacity. Only 12 percent said users were fully utilizing the machines.

However, the 100 users included in the survey disagreed. More than half (53 percent) said they use their personal computers as much as initially expected, and 42 percent said the machines are being used more than anticipated.

The survey was conducted last August for Control Data Corp. (Minneapolis) by Penn + Schoen Associates, a New York research house. It examines the beliefs and attitudes of 100 management-information systems (MIS) managers, 100 employees who use personal computers on the job, and 100 employees who don't use microcomputers at work.

Utilization is often raised as an issue in corporate personal-computer deployment. Indeed, some organizations require prospective users to project the number of hours they'll use personal computers before purchases are approved.

The managers in the survey clearly believe users can do a good deal more with personal computers. But managers don't seem to be overly concerned about taking action to improve utilization. Only 6 percent of the respondents said they are dissatisfied with their organizations' personal computers. Seventy-eight percent are satisfied.

The most popular personal-computing application among user respondents was doing budgets, with "spreadsheet analysis" finishing a close second. As the accompanying chart demonstrates, employees are using their machines for a variety of tasks.

Fifty-nine percent of the sample said they've expanded their duties using personal computers. The managers haven't realized such impressive on-the-job gains. Only 11 percent said their workload had been reduced by personal computers, while 53 percent noticed no change.

Based on the responses from the three groups in the survey, Penn + Schoen concluded that managers and employees alike don't fully understand personal computers in a corporate setting. Many managers and users need better insight into how personal computers can be integrated into existing information-processing systems in a tailor-made arrangement.

Of course, as a vendor of databases, Control Data's interest in the survey is in managerial and user attitudes toward databases. Among MIS managers, 46 percent said they didn't think their departments were using all available database services. However, 27 percent of the managers discouraged use of such services.

Most-popular micro applications

	Percent performing task	Hours saved		
		2	3–5	6+
Calculating budgets	63	64%	15%	6%
Spreadsheet analysis	58	65	15	10
Preparing lengthy documents	52	59	15	8
Reviewing records	32	59	24	10
Accounting	31	71	18	8
Market-analysis reporting	27	76	16	0
Interoffice memos	23	75	15	5
General research	22	72	6	17

IBM PC is conquering OA

Major vendors of office systems are moving to connect the IBM Personal Computer to their systems. The "PCing of the automated office" was one of the trends revealed at the recent Hammer/Seybold Forum on office systems and professional computing.

The IBM PC is "the most important development in office automation of the past five years," David Klein, executive vice president of NBI Inc., told the conference. IBM's machine is nettlesome for NBI, a Boulder, CO-based supplier of word-processing systems. Klein said that some user organizations have more PCs hooked to shared-resource systems made by NBI than they do NBI workstations.

Tying office-automation systems to IBM mainframes is the other major thrust in current office automation. One vendor after another has revealed plans to tie equipment into IBM's various communications protocols or document-sharing schemes.

IBM standards are not the only ones gaining support. Executives from AT&T Information Systems (New York) and Digital Equipment

news & comment

16-bit processors, 128 Kbytes of memory, or a color monitor received extra points. If a display or keyboard was not included with the basic system, the machine lost points.

The Guide costs $20. For more information, call The Management Training Institute Inc. at (301) 881-7666.

Walking fingers

The FM/3000 productivity systems for minicomputers, from Computer Solutions, can now be accessed by the touch-screen Hewlett-Packard 150 personal computer. Users can literally walk through the systems' menus and databases with their fingers.

FM/3000 includes programs for manufacturing-resource planning, inventory control, accounts receivable, accounts payable, sales-order processing, and general ledger. A version for marketing is called FM/3000 Plus.

The HP 150-link package offers three new features: Browse, Help, and Executive Inquiry. Each can be activated via the touch screen. Browse lets a user scroll alphabetically or numerically through all the files in a database. Help can be activated at any point in an operation; its function is self-explanatory. Executive Inquiry lets users pose any one of 20 questions to the database.

A version of FM/3000 that runs on HP 3000 minicomputers costs $40,000. FM/3000 Plus costs $55,000. Timesharing is also available. For more information, contact Computer Solutions at (617) 229-2200.

Users rate small systems

Users of small systems aren't happy about the trend away from traditional on-site maintenance for small systems. According to a survey of 251 managers by Input, Mountain View, CA, managers would rather go the traditional route. Fourteen vendors were covered. Apparently, new methods of providing service that give users more responsibility dissipate the lines of communication between managers and vendors.

Responding managers said they need better service than vendors are providing. Software service did not rate as highly as service for hardware. As expected, managers gave low marks to documentation. Because documentation usually is given low priority during the product-development cycle, late delivery of documents is common and quality is generally poor. Another problem is that the documentation is usually written in technical language. Many managers said they need plain English. In an attempt to remedy this problem, some vendors have merged engineering and sales groups, creating documentation departments.

Respondents included company presidents, managers, and analysts employed by organizations with from $1 million to $1 billion in annual sales. Only 15 of the respondents were corporate officers. By far, the greatest number had the title of "manager." The survey was conducted last summer.

Service ratings on small systems

Vendors	Service image	Software service	Problem diagnosis
Autotrol	6.19	5.00	6.81
Burroughs	6.77	6.55	7.10
Computervision	7.32	6.21	7.32
Digital Equipment	8.03	7.30	7.87
Data General	8.03	8.56	8.10
Datapoint	7.65	7.27	7.45
Four Phase	7.40	6.65	7.60
Hewlett-Packard	7.70	7.05	7.37
Honeywell	7.40	6.50	7.67
IBM	8.25	7.79	8.21
Intergraph	7.15	6.22	7.45
NCR	7.57	6.27	7.43
Prime	8.05	7.27	7.55
Texas Instruments	7.35	7.40	7.84
All vendors	7.54	6.79	7.60

Small-systems users in the Input survey were asked to rate vendors on a scale of 1 to 10 in three categories: overall service image, ability to maintain software, and ability to diagnose and repair hardware problems. The chart lists the mean ratings. Reprinted by permission of Input.

Rolm looks ahead

Communications technology may be changing rapidly, but Rolm Corp. has designed its new digital switch to last through the end of the millennium. The CBX II private automatic branch exchange (PABX) will still be useful in the year 2000, the vendor claims.

The CBX II incorporates dynamically allocatable bandwidth, which accommodates communications between two network devices on up to 192 lines, each operating at 192,000 bits per second (bps). If two devices communicate at a higher speed, their transmissions will occupy more than one channel. For example, if two devices operate at 1 Mbps, six channels with a total capacity of 1.15 Mbps can be assigned to their communications. The system's aggregate limit is 4.4 billion bits per second. The CBX II is non-blocking.

The CBX II is designed to handle

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news & comment

(Continued from page 22)

managers to avoid treating employees like machines. "We are all entitled to engage in a reasonable degree of socializing at work," he says, "and being late once in a while is understandable."

IBM's new graphics

Continuing its aggressive moves into engineering and design graphics, IBM has announced a new system that produces images with the detail of photographs. The Model 5080 system uses up to 256 hues and gray shades.

The system's 19-inch monitor has more than one million addressable points. Many of the computations required to create three-dimensional drawings can be done at the workstation without the assistance of a host computer. A tablet input device and either mouse or stylus cursor-control devices extend the flexibility of the system.

The Model 5080 is compatible with IBM's 3250 graphics system. A monochrome version (pictured) costs $19,750. With a color display terminal and 16 colors, the price is $24,750.

Space saver

One way to conserve valuable desk space is to hang the processing unit of your personal computer on the side of the desk. The System Sidekick suspends the central processing unit of personal computers made by IBM, Digital Equipment Corp., or Texas Instruments. The cost is $79.95. For more information call Lintek Computer Accessories at (616) 241-4040.

Sony heads up wp honor roll

Text systems from eight vendors have received top honors on the Honor Roll of Word Processing Systems. The ranking of systems is issued annually by Datapro Research Corp., based on a survey of users.

The Sony Series 35 tops this year's Honor Roll, followed by Compucorp's Omega 60 and two systems from CPT. Ironically, the fifth finisher, Dictaphone, announced last October that it would stop manufacturing word processors.

The survey results reveal that a growing number of users are buying their systems, as opposed to renting or leasing them. This year, 46 percent of respondents said they had purchased multi-terminal systems, up from 38 percent the previous year. Users show little interest in adding communications capabilities to their systems, according to the results, even though such capabilities are becoming more readily available.

The latest listing is based on the ratings of more than 4,800 users of stand-alone and multi-terminal word-processing systems. The users rated systems on a number of points, including overall reliability, peripheral reliability, and performance vs. anticipated performance.

For a system to earn a spot on Datapro's list, it must be rated by at least 20 users, receive an overall-satisfaction rating of 3.2 on a scale of 4, and have no single score of less than 2.9 on the same scale.

Datapro's Honor Roll is part of "User Ratings of Word Processing Systems," a report that includes de-

(News continued on page 30)

The word-processing honor roll

	Number of users	Overall rating*	Lowest rating
Stand-alone systems			
Sony Series 35	20	3.7	3.4
Compucorp Omega 60	85	3.7	3.3
CPT 8500 Series	86	3.6	3.2
CPT 8000/8100	216	3.5	3.1
Dictaphone Dual Display**	30	3.5	3.1
CPT 6000/6100	27	3.5	3.0
NBI OASys 3000	175	3.4	3.0
Multi-terminal systems			
NBI OASys 64	76	3.6	3.2
Philips 2002	49	3.6	3.1
NBI OASys 8	73	3.5	3.1
Wang WPS 20	22	3.5	2.9
A.B. Dick Magna SL	61	3.4	3.0

**Weighted average based on a scale of 1 through 4.*

***Dictaphone no longer manufactures word-processing equipment.*

(Continued from page 26)

tailed ratings of 71 systems. The report costs $25, and is available from Datapro Research Corp., 1805 Underwood Blvd., Delran, NJ 08075. The phone number is (609) 764-0100.

More portable and personal computers

Texas Instruments, long the leader in portable printers, has finally introduced a portable personal computer—or, as TI's vice president Eric Jones calls it, a *trans*portable personal computer. Weighing about 45 pounds with two floppy-disk drives, the color version of the TI Portable Professional Computer cannot be carried comfortably under your arm. The monochrome version with one disk drive weighs 32 pounds.

Unlike many of the recently introduced portables, TI's machines, which are assembled in Japan, are not compatible with the IBM Personal Computer. However, many of the packages popularly used on the IBM PC run in MS-DOS 2.1 versions on the TI machines. The new portables cost $2,395 for monochrome, and $2,965 for color.

Xerox has introduced a number of options that fit the TI Professional and portable computers. These are: kits that expand internal memory to 768 Kbytes in 256-Kbyte increments; software that lets machines emulate a standard IBM 3276 Model 12 control unit/display station with a 3287 printer; and a numeric co-processor that accelerates calculation-intensive applications by as much as 100 times. A 10-Mbyte hard disk for the Professional was also announced, but hard disk will not be available on the portables until September.

Xerox Corp. has also unveiled its first portable computer, the Xerox 1810. The 5-pound unit can be carried in a briefcase, and will run for up to 10 hours off a built-in rechargeable battery. The 1810 is the first member of the Xerox 1800 family, but there are plenty of peripherals to enhance it. On its own, the 1810 has 64 Kbytes of memory, a three-line, 80-character LCD display, a tape recorder with a microcassette, a Basic language compiler, and automatic-dialing capabilities that manage up to 30 numbers. It also has an alarm clock, which indicates Xerox's desire to meet all the business traveler's needs. The 1810 runs CP/M software, and costs $2,195.

The Commuter from Visual Computer Inc. is another IBM PC-compatible portable. It weighs 16 pounds, and comes with 128 Kbytes of memory, a 360-Kbyte floppy-disk drive, the MS-DOS 2.1 operating system, and a keyboard that looks like the IBM Personal Computer's. Greater memory and storage are optional, as is an 80-character, 16-line LCD display. The basic model costs $1,995. You can call Visual Computer at (617) 480-0000.

Televideo Systems has added a portable computer and a hard-disk desk-top system to its line of PC-compatible systems. The TPC II portable follows up the company's TPC I, an 8-bit machine that was not compatible with the IBM PC. The basic configuration with 128 Kbytes of RAM, one disk drive, and a 9-inch monitor, weighing in at 33 pounds, costs $2,995. The hard-disk system, the TS 1605H, which is not a portable, is compatible with the IBM PC-XT. Televideo's previously announced TS 1605 is compatible with the IBM PC. With 256 Kbytes of RAM, the 10-Mbyte hard disk, a 360-Kbyte floppy, and a 14-inch display, the 1605H costs $4,995.

The PC Traveler is also IBM PC-compatible. From Strategic Technologies Inc., the Traveler incorporates many rare features into its 26-pound bulk. The vendor claims its use of a plasma display is a first for personal computers. The display can be found when the lid portion of the

The color version of the TI Portable Professional Computer weighs 45 pounds and includes two floppy-disk drives.

OFFICE AUTOMATION

And the race goes on—Part II

The era of office automation is, without a doubt, here. Once considered applicable only to large organizations, the need for and cost-effectiveness of OA are having an increasingly greater impact in smaller, single-site, companies. And typical of the U.S. marketplace—whether it be for pens, automobiles, or computers—as demand grows, more and more vendors spring up, offering the American buyer an enormous variety of products.

With all the choices that are bombarding you, how can you know what criteria to apply when deciding on a vendor? There are two important questions that small organizations facing potential growth should ask: Will the vendor survive in the current competitive climate? and, If so, will the vendor still serve our needs as our organization expands?

Last month, in Part I of this report, we addressed the importance to Fortune 1,000 companies of a vendor's five-year survivability, and reported the results of the first half of our survey. (We queried members of the Office Automation Society International, and received a total of 36 responses. In last year's survey of office-automation consultants and managers of OA projects, we received only 22 responses.) This month, we bring you the results of the second half of our survey, which considered the survivability of vendors to the smaller, single-site, companies.

The survey recipients were asked to check one of three ratings for each vendor named (there were 34 in all). The choices included "sure survivor," "likely survivor," and "not likely." In totaling the scores, a "weight" of 10 was assigned to each "sure survivor" vote, 6 to each "likely survivor" vote, and 2 to each "not likely." The highest possible score any vendor could attain was 360, but no vendor received that score because not all respondents rated every vendor. (In last year's survey, reported in the January and February 1983 issues, the highest possible score was 220.)

Keep in mind that this survey indicates knowledgeable users' *perceptions* on the survivability of vendors. It shows, by implication, which vendors will be favored enough by buyers to still be around in five years. Although it does not bear the imprimatur of any office-automation expert, it still merits attention. What users *think* about the equipment available to them will undoubtedly affect the market.

The chart that accompanies this second-half report provides total scores, as well as "sure survivor" votes, for suppliers to single-site companies. It also compares these with each company's scores in last year's survey.

The cost-effectiveness of OA is having an increasingly greater impact in the smaller, single-site, companies.

The roster of "Top 10" vendors is surprisingly different from last year's list. In rank order of total scores, the winners are: Apple Computer (334); IBM (312); Digital Equipment Corp. (272); Wang Laboratories (256); Hewlett-Packard (230); Xerox (222); AT&T Information Systems (218); Kodak (192); Lanier (184); and Honeywell (182).

Moving up from last year's third-place spot, Apple Computer captured the top position, leaving behind such giants as IBM, Digital Equipment, and Wang. It received 31 "sure survivor," four "likely survivor," and one "not likely" vote. Apple's success might be the payoff of superb marketing; it seems to have convinced the small-business market that its product is perfect for the needs of a small organization.

IBM's Personal Computer and Displaywriter have given it almost as strong a foothold in the small-business market, and the experts think Big Blue is there to stay. Their votes of confidence included 30 "sure survivor" and two "likely survivor."

Digital Equipment Corp. has also had a strong impact, as evidenced by its move from fifth place in last year's survey to third this year.

Wang's slip from second place last year to fourth place makes one wonder about the depth of its penetration into the single-site market. The votes for this company included 21 "sure survivor," seven "likely survivor," and two "not likely."

Surprisingly, Hewlett-Packard, which was not even in the "Top 10" last year, took fifth place. Sixteen "sure survivor," 11 "likely survivor," and two "not likely" votes were cast for HP.

Although it lost ground in the Fortune 1,000 race, Xerox moved up among the single-site suppliers from seventh to sixth place.

AT&T Information Systems is also moving in a positive direction—it jumped from ninth place last year to seventh in the current survey, and picked up 16 "sure survivor" and 13 "likely survivor" votes along the way.

A new addition to the survey, Kodak, stepped right into eighth place, while Lanier slipped from sixth in last year's poll to ninth place. Honeywell, which didn't make the "Top 10" last year, squeezed into the number-10 spot over 3M.

Noticeably missing from this

year's "Top 10" roster are Tandy (Radio Shack), CPT, and NBI. This change in the lineup, coupled with Lanier's drop in status, may indicate a future trend. As equipment continues to evolve, growing still more sophisticated, support and training will become increasingly critical aspects of servicing the small-business market. This will require vendor companies of substantial size.

Therefore, the future may belong to those vendors who are already big fish—and will become even bigger by swallowing up the small fry. □

"Survivor" survey results for smaller users

Vendor*	Total score 1989	"Sure survivor" votes 1989	Total score 1988	"Sure survivor" votes 1988
Anaconda-Ericson	62	1	—	—
Anderson Jacobson	114	4	54	1
Apple Computer	334	31	162	10
AT&T Information Systems	218	16	128	10
Bell & Howell	172	11	—	—
Burroughs	180	7	70	1
CPT	160	7	124	6
Data General	170	8	70	0
Datapoint	152	4	76	1
A. B. Dick	134	3	78	1
Dictaphone**	194	9	112	2
Digital Equipment	272	19	152	12
Exxon Office Products	158	6	48	0
Hewlett-Packard	230	16	116	7
Honeywell	182	7	84	2
IBM	312	30	178	17
Kodak	192	11	—	—
Lanier	184	6	148	9
Motorola (Four Phase)	126	4	74	0
NBI	124	4	132	5
NEC	130	8	92	1
Nixdorf	88	2	60	0
Northern Telecom	162	8	74	2
Olivetti	138	5	92	2
Philips (Micom)	82	4	90	1
Prime	174	8	88	0
Raytheon (Lexitron)	90	1	78	1
Rolm	114	4	62	1
Royal	104	2	80	0
Sony	152	6	94	2
Sperry	122	3	58	1
Syntrex	98	3	74	0
Tandem	104	2	94	1
Tandy (Radio Shack)	230	14	160	10
3M	180	10	—	—
Wang Laboratories	256	21	172	16
Wordplex	84	2	26	0
Xerox	222	14	136	8

*These results show which vendors members of the Office Automation Society International think will be serving smaller, single-site, companies in five years. Vendors that received write-in votes from respondents include CPI, Kaypro, Siemens, and Texas Instruments.

**In October, Dictaphone announced its withdrawal from the word-processing business.

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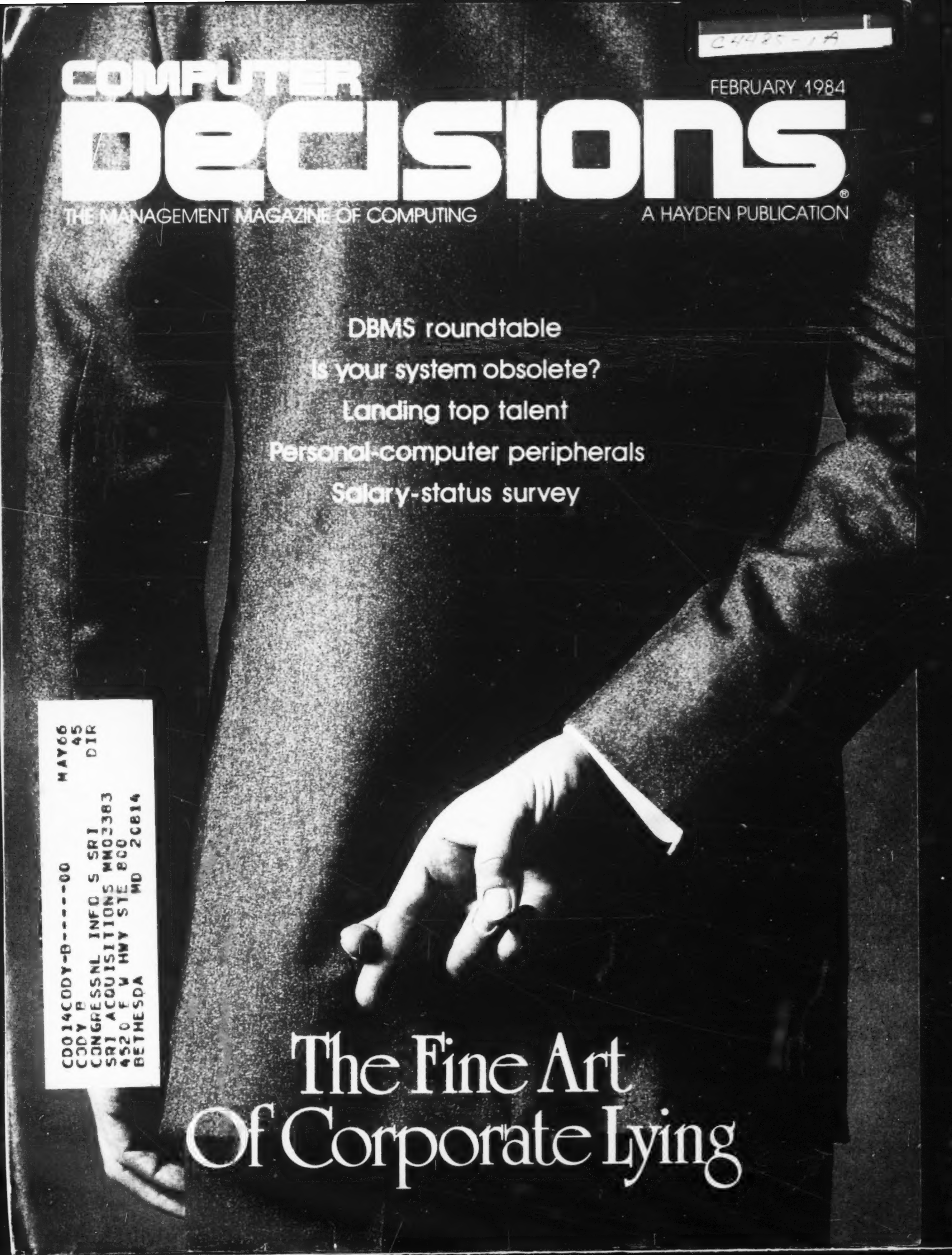

DBMS roundtable
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Salary-status survey

The Fine Art Of Corporate Lying

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THE MANAGEMENT MAGAZINE OF COMPUTING
FEBRUARY 1984
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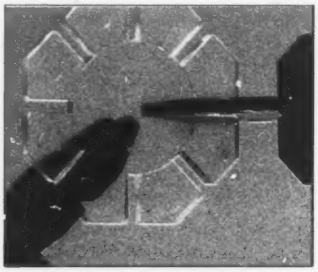

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COVER PHOTO: Edward Hardin

WHERE THE DOLLAR$ ARE

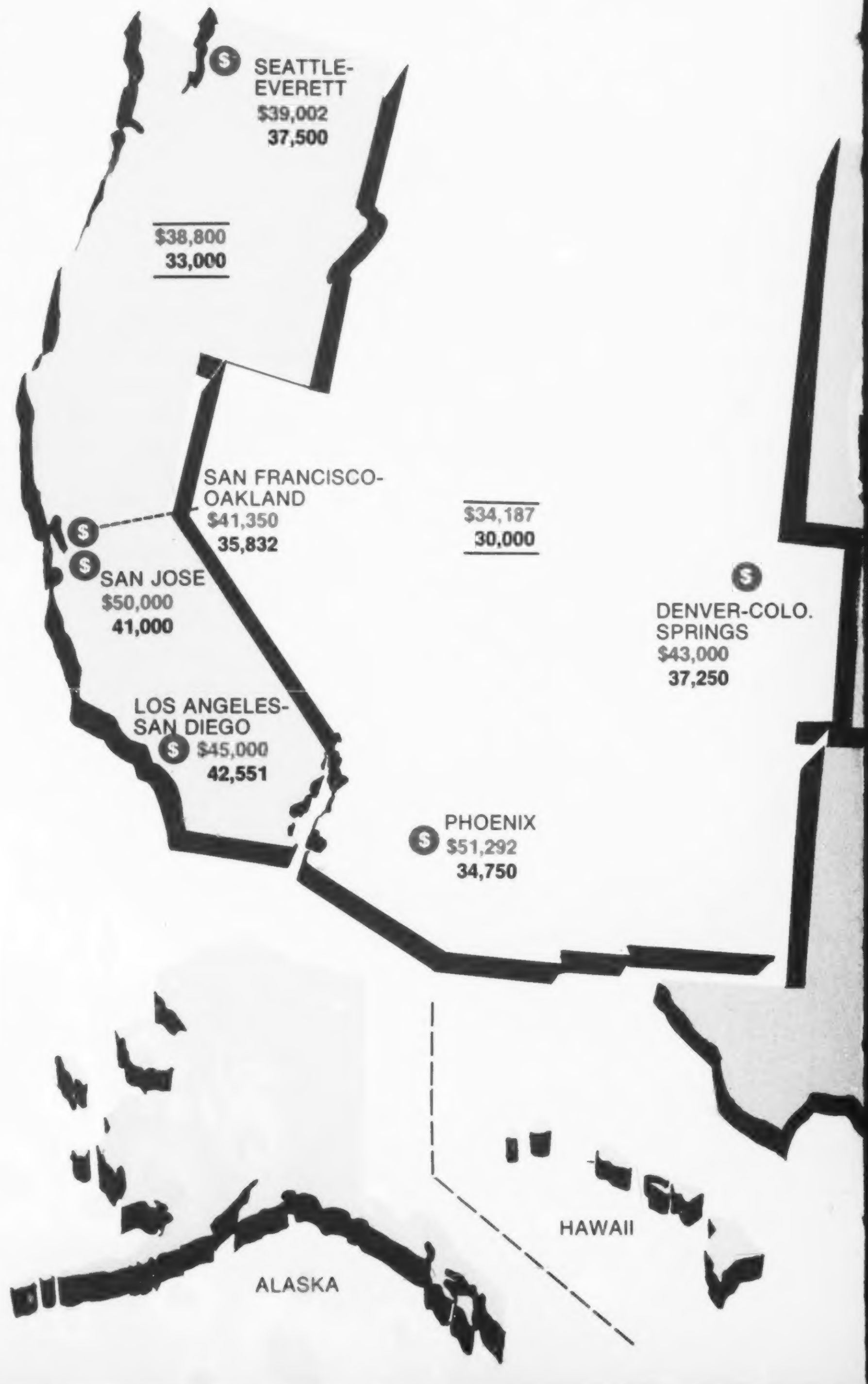
MIS/dp managerial salary increases in 1983 weren't spectacular, but steady growth continued. Did you measure up to the average?

SALARY-STATUS SURVEY, PART 1

by David Whieldon, Senior Editor

Money isn't everything, but it's one of the key indicators of your professional standing and progress toward your career goals. Indeed, your salary is the return on the time, training, and skills you've invested in your career. How healthy is your investment?

According to the latest *Computer Decisions* Salary-Status Survey, most MIS/dp managers realized healthier gains in 1983 than they


SEATTLE-EVERETT
$39,002
37,500
$38,800
33,000
SAN FRANCISCO-OAKLAND
$41,350
35,832
$34,187
30,000
SAN JOSE
$50,000
41,000
DENVER-COLO. SPRINGS
$43,000
37,250
LOS ANGELES-SAN DIEGO
$45,000
42,551
PHOENIX
$51,292
34,750
HAWAII
ALASKA

KEY:
TOP MIS/DP OFFICER
DATA-PROCESSING MANAGER

Illustrations by Bob Ritter

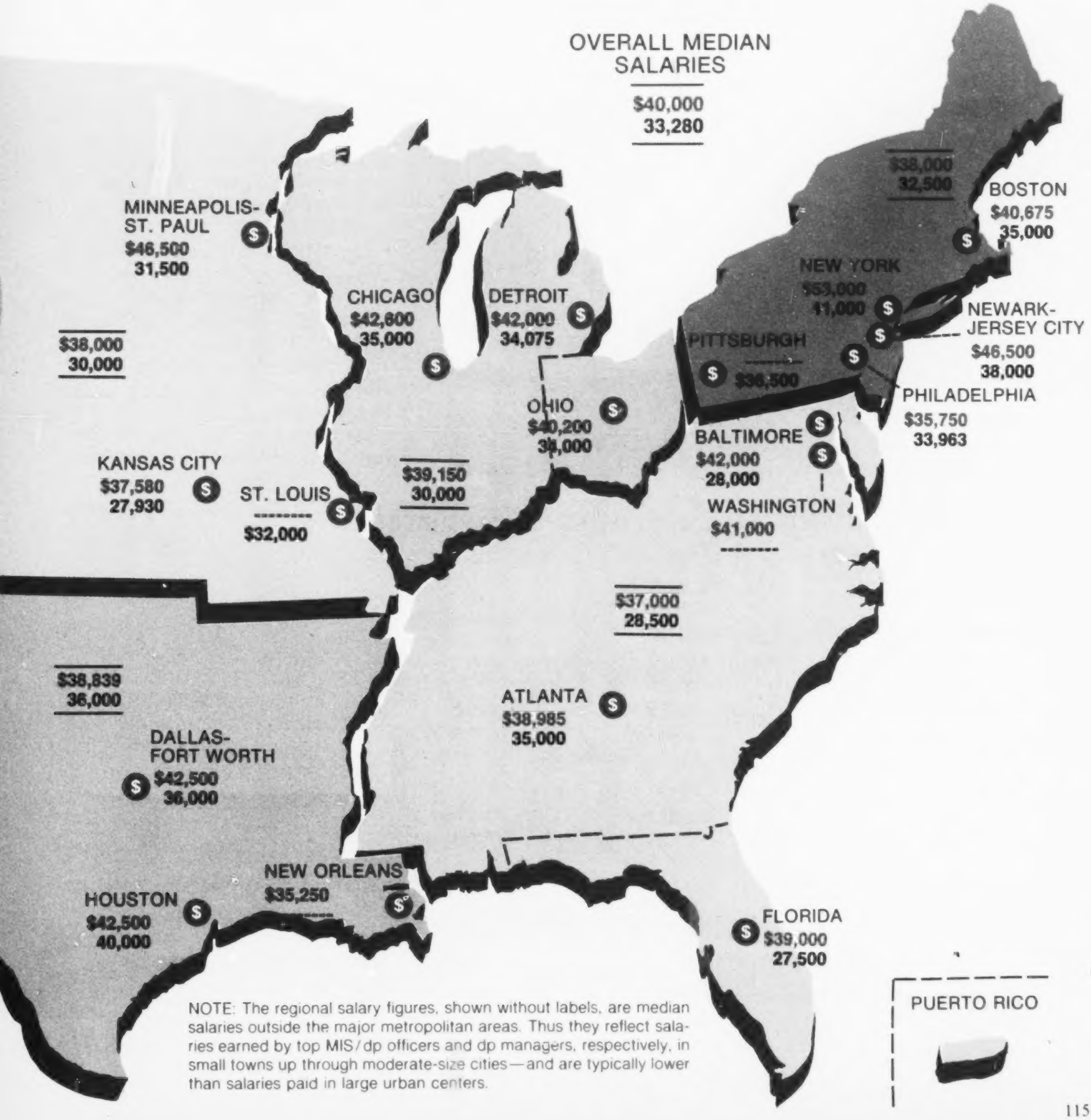
had during the previous two recessionary years. MIS/dp officers and managers made modest gains last year, and the overall figures indicate that information processing remains a good place to be.

Most industries have recovered from the recession. The exceptions are in manufacturing (where nearly a third of the respondents to the survey work), education, and government. In fact, MIS/dp managers in government, particularly at the state and local levels, and education are still suffering from the effects of budget cuts and wage freezes imposed during the recession.

On the whole, respondents said they're more satisfied with their jobs than dissatisfied. More than half (54.7 percent) are somewhat or quite content. Nonetheless, almost 90 percent said they'd jump ship if the incentives were attractive enough. Chief among the enticements is an increase in salary, with 83.5 percent of the respondents saying they'd move to get a heftier paycheck. However, managers aren't ready to change jobs for a peanuts salary increase: The typical manager won't move for less than a 20 percent increase.

Just how have MIS/dp officers and managers been faring? Some

MIS/dp managerial salaries in metro areas—and outside


OVERALL MEDIAN SALARIES
$40,000
33,280
$38,000
32,500
BOSTON
$40,675
35,000
NEW YORK
$53,000
41,000
NEWARK-JERSEY CITY
$46,500
38,000
PITTSBURGH

$36,500
PHILADELPHIA
$35,750
33,963
BALTIMORE
$42,000
28,000
WASHINGTON
$41,000

MINNEAPOLIS-ST. PAUL
$46,500
31,500
CHICAGO
$42,600
35,000
DETROIT
$42,000
34,075
OHIO
$40,200
36,000
$38,000
30,000
$39,150
30,000
KANSAS CITY
$37,580
27,930
ST. LOUIS

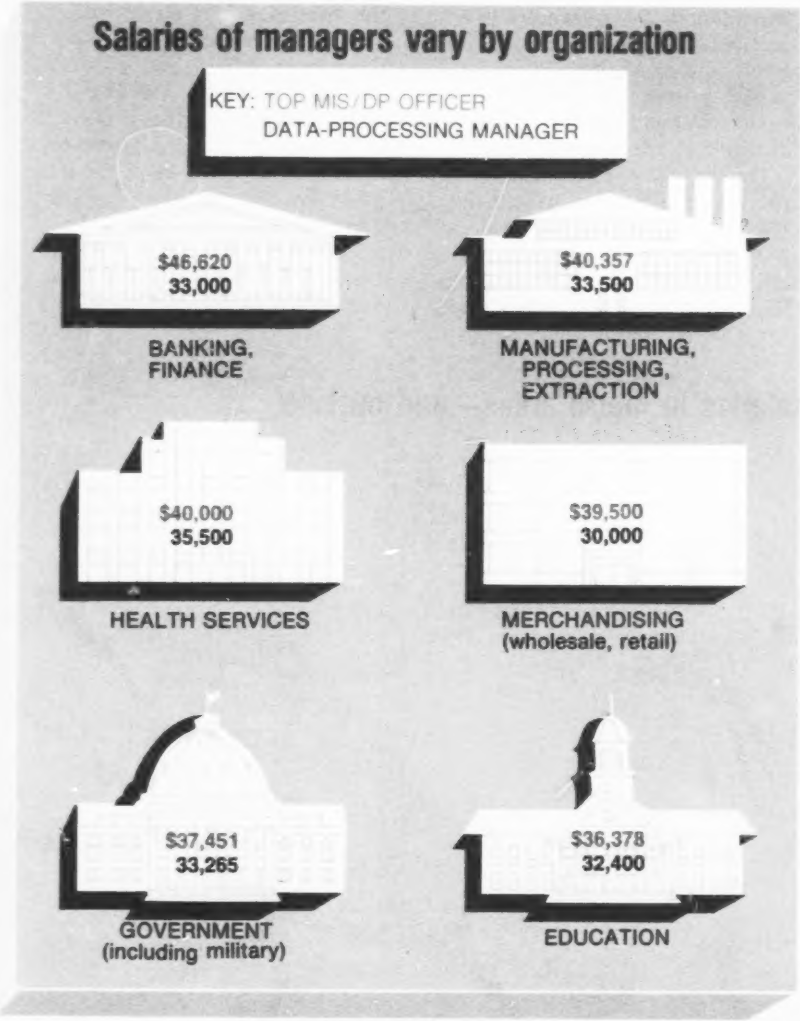
$32,000
$37,000
28,500
$38,839
36,000
ATLANTA
$38,985
35,000
DALLAS-FORT WORTH
$42,500
36,000
NEW ORLEANS
$35,250

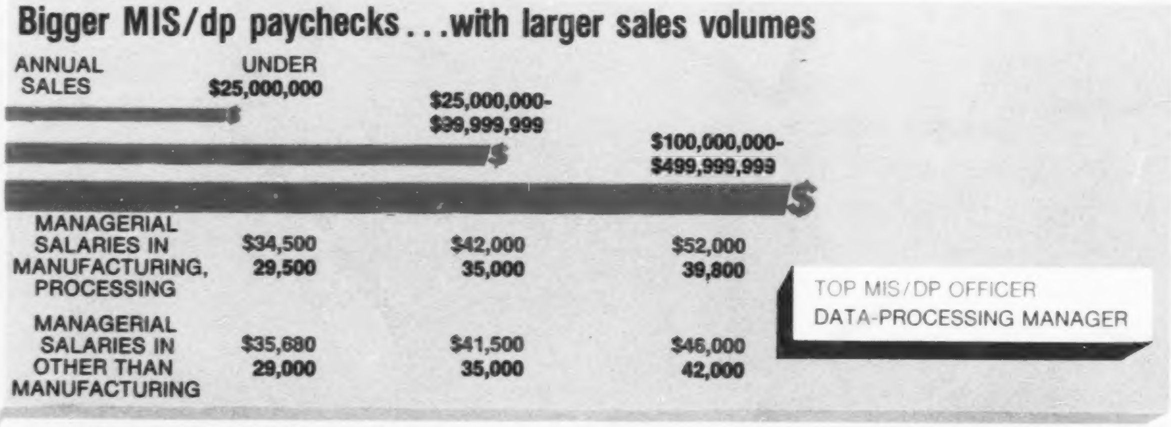
HOUSTON
$42,500
40,000
FLORIDA
$39,000
27,500
PUERTO RICO

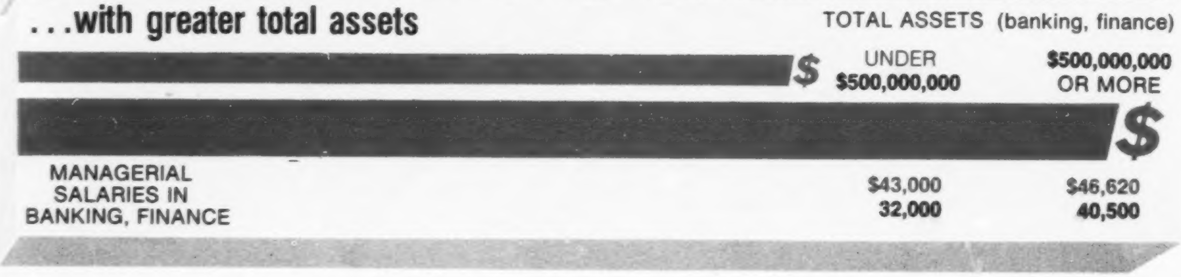
NOTE: The regional salary figures, shown without labels, are median salaries outside the major metropolitan areas. Thus they reflect salaries earned by top MIS/dp officers and dp managers, respectively, in small towns up through moderate-size cities—and are typically lower than salaries paid in large urban centers.

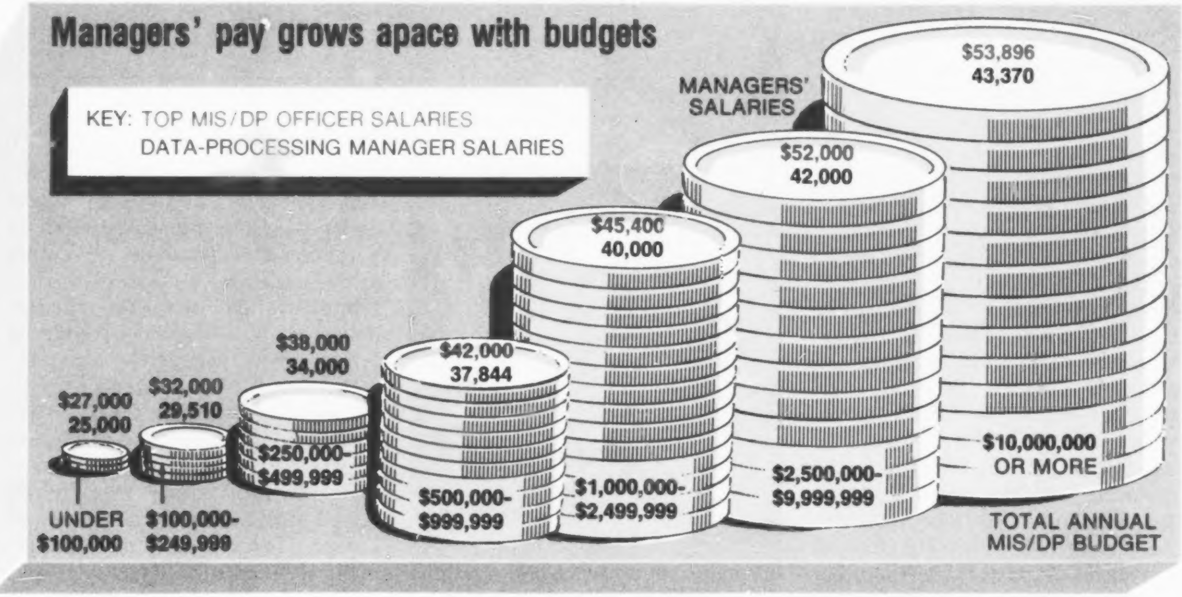
highlights from the survey results show continued growth in compensation:

- The median salary for the top MIS/dp officers was $40,000, while the data-processing managers' pay was typically $33,280. The top figure is 7.2 percent higher than last year's composite median for both categories.
- Nearly 80 percent of respondents received pay boosts between Aug. 15, 1982 and Aug. 15, 1983, the great majority without being promoted.
- Salary increases averaged 7.8 percent, but more than 75 percent of the respondents who reported raises got up to 10.9 percent.
- Salaries for top MIS/dp officers tend to be highest in banking and finance (a $46,620 median), followed, in order, by, manufacturing, processing, and extracting; health services; merchandising; government; and education (lowest median in this series at $36,378).
- Top MIS/dp officers on the west coast—in nonurban areas—earn more than their peers in other sections of the country (a median of $38,800). Those in the Mountain states ($34,187) are paid the least. However, the highest salaries are to be had in New York City.
- Many MIS/dp managers consider their salaries sub-par, compared to


Salaries of managers vary by organization


Bigger MIS/dp paychecks...with larger sales volumes


...with greater total assets

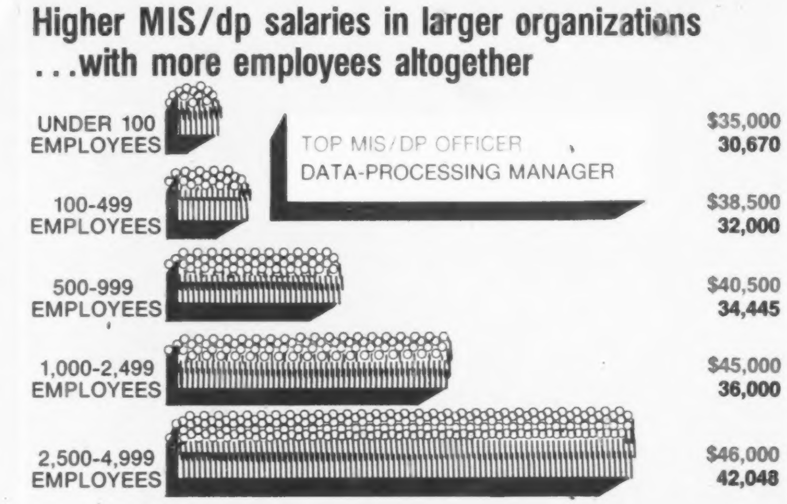


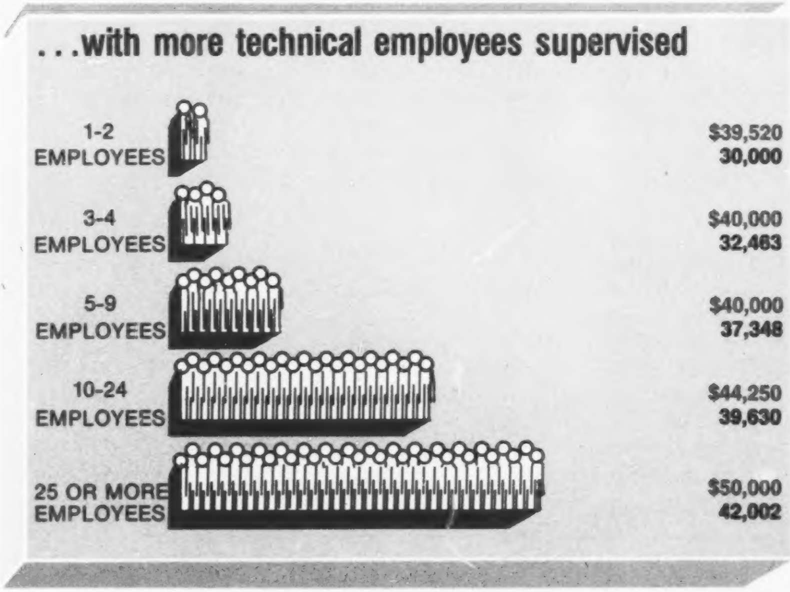
the salaries of managers with comparable responsibilities. However, almost 30 percent of the respondents said their salaries are better than those of other managers.

- Cash compensation above and beyond salary is a relatively small element in the wage picture. The typical top MIS/dp officer earned a little less than $1,000 in extra compensation last year. The typical dp manager earned $720.

This year's Salary-Status Survey is different from those of past years. It was conducted by Abbott, Langer & Associates, and it examines compensation trends in two management categories: top MIS/dp officers and dp managers. *MIS/dp officers* are those who have "primary responsibility" for MIS/dp. They do not work in "company or financial management." *Dp managers* plan, organize, and control data-processing functions like systems analysis, programming, and computer operations. In most cases, the dp manager works for an MIS/dp officer.

The differences in responsibility produce a substantial difference in salaries: The nationwide median for top MIS/dp officers is almost $7,000 higher than the national median for dp managers. But the spread varies considerably. Comparing medians in the cities, for example, the top officer in Chicago gets $7,600 more in annual salary than a dp manager, whereas





Salary-Status Survey

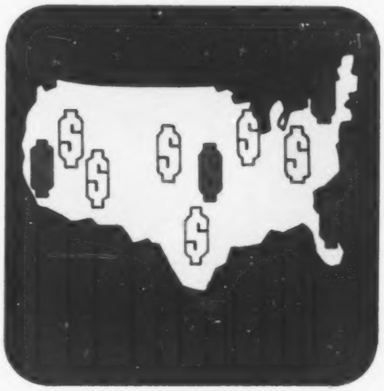
(Continued from page 117)

in Washington, the differential is only $1,033. It's no surprise that in New York, both positions command the highest salaries of all—$53,000 and $41,000, respectively.

One New Yorker in the survey fills the bill for a top MIS/dp officer. Working for a financial organization, he earns between $50,000 and $60,000 and received a raise of between 11 and 13.9 percent last year. He supervises fewer than 10 employees, and administers an MIS/dp budget of more than $500,000. The manager is in his 30s, and he believes his salary is better than that of other managers. Nevertheless, he would change companies for greater challenge and "significant ownership of the organization." This manager could go into general management, because there he'd find "opportunities to become a revenue generator."

Certainly this manager is not alone in a willingness to move out of MIS/dp: Two out of five respondents in the survey checked the "Yes" box on the questionnaire when asked if they'd be willing to move into general management.

Similar differences between the salaries of MIS/dp officers and dp managers appear when organizations, sales volumes, budgets, number of employees, and other factors are taken into account. (See the charts that accompany this article.) But one trend cuts across all categorizations: If you want to be a top earner, it always pays to be in the top job! Of those at the top of the heap in their respective organizations, half earned from $33,084 to $47,580, while nine-tenths got from $27,000 to $56,[illegible]0. In contrast, half of those defining themselves as dp managers reported incomes of $27,948 to $40,000, with nine-tenths receiving $23,000 to $45,000.



Other financial rewards add to the compensation of MIS/dp officers and managers. Chief among those is cash bonuses, mentioned by nearly 30 percent of respondents. Even so, additional cash isn't plentiful. Bonuses varied from a few hundred dollars to about $1,000 for the typical top officer or manager.

A minority of respondents received long-range financial rewards like stock options and profit-sharing last year. One-fifth said they shared in company profits, one in eight received stock options, and one in 10 enjoyed investment-fund management. (Other benefits, which may indirectly boost income by 30 to 40 percent, will be discussed next month in Part II of this article.)

Right place, right company

Rates of pay, of course, depend on more than job titles. Where you are—geographically and economically—has a big impact on the amount of money you make. Even if you're not the top officer in MIS/dp, you may be doing well just because you're in a particular part of the country, the right kind of organization, or the right size organization. (The corollary, of course, is that you may not get what you'd like because you're in the wrong spot.) The manager in charge of dp for a Long Island-based manufacturer, for example, typifies the right mix. His company has sales of more than $100 million. The manager administers an MIS/dp budget of between $1 million and $2 million and has between 30 and 39 subordinates. The manager, who's in his 30s, earned between $50,000 and $60,000 last year.

Location is a conspicuous factor in salary comparisons, and "city mice" live better than "country mice" in MIS/dp. Generally both top MIS/dp officers and dp managers draw larger paychecks in the metropolitan areas than in smaller cities and the countryside.

For example, the top MIS/dp officer typically earns $45,000 in the Los Angeles-San Diego area and $41,350 in the San Francisco-Oakland area. Those figures contrast

The "other" managers

The number of specialized MIS/dp managers has ballooned in recent years, and this year's *Computer Decisions* Salary-Status Survey reports on their earnings for the first time. Several of these specialties, such as database manager, were almost unknown three years ago, except in a few large dp shops.

What are these managers worth? The following table lists the median annual salary reported by respondents to the survey.

Title	Median salary
Database-systems manager	$38,824
Computer-systems analysis/programming manager or supervisor	$35,462
Systems-analysis manager or supervisor	$36,000
Systems-programming manager or supervisor	$34,804
Applications-programming manager or supervisor	$34,715
Communications manager	$30,000
Computer-operations manager or supervisor	$25,126
Computer-input/output-control manager or supervisor	$18,500
Key-entry supervisor	$16,932

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CIRCLE 137

Salary-Status Survey

(Continued from page 118)

with $38,800 median salary *outside of the four major metropolitan areas* in the Pacific region (California, Washington, Oregon, Alaska, Hawaii, Guam). A dp manager typically earns $33,963 in Philadelphia and $35,000 in Boston; outside of the five big northeastern metropolitan areas, the amount is $32,500.

That nonurban median of $32,500 for the northeast is better than the median $28,500 for the southern states, again excluding metropolitan areas. In between is the $30,000 for the Mountain region and also for the north-central states.

Salaries also reflect the size of an organization, its dependence on information processing, and the industry of which it is a part. Which companies pay the most? Bigger organizations generally have larger MIS/dp budgets, and as budgets grow, so do salaries. In fact, the top MIS/dp officer can expect to double his or her salary by moving from an organization with a budget of less than $100,000 to one with $10 million or more. Such a move probably won't be possible in one step, but many managers work through the ranks from small to large organizations.

"Total annual MIS/dp budget, along with supervisory responsibility, is an excellent predictor of income in the MIS/dp field," says Steven Langer, head of Abbott, Langer & Associates. The median budget in the survey was $388,679; the *average* (or mean) budget, which was more influenced by the 26 respondents with budgets of $40 million or more, was just under $2.5 million.

Likewise, salaries roughly correlate to the size of a company's total workforce. For instance, a typical dp manager in an organization with fewer than 100 employees earned $30,670 last year. But in organizations with 2,500 to 4,999 employees, he or she earned $42,048.

Managers who oversee more employees tend to earn more. Managers with up to nine subordinates earned a median salary of $32,721. Those who supervise from 40 to 69 employees earned a median of $47,084. The type of employees a manager supervises is also important, according to the survey results. Managers who supervise many technical subordinates earn higher salaries.

Finally, education and experience pay dividends, too, as most managers have discovered. For instance, a top MIS/dp officer without a college degree typically earns an annual salary of $35,888, whereas one with a bachelor's degree receives $40,926. Earning a Ph.D. drives up the salary to a median of $42,000, but a master's in business administration is worth even more. Top MIS/dp officers with MBAs typically earn $45,000.

Additional cash wasn't plentiful. Bonuses varied from a few hundred dollars to about $1,000 for top MIS officers.

As to experience, for the top MIS/dp officer, one to two years in the specialty fetches a median salary of only $25,500; that figure builds gradually to the top figure of $46,400, which accrues from 20 to 24 years. These principles hold true for dp managers as well.

As expected, organizations that are in the business of earning profits pay their information handlers better than do nonprofit organizations. The median salary for the top MIS/dp officer in banking and finance, the highest-paying field, is $46,620. In manufacturing, processing, and extraction, the median is $40,357. In contrast, the median salary is only $36,378 for MIS/dp managers working for educational institutions.

Increasing demands

For many managers, of course, progress comes in increments, but the pace has increased during the last two years. Most of the respondents got a pay boost between mid-August 1982 and mid-August of 1983—even if the median increase was a modest

Salary-Status Survey

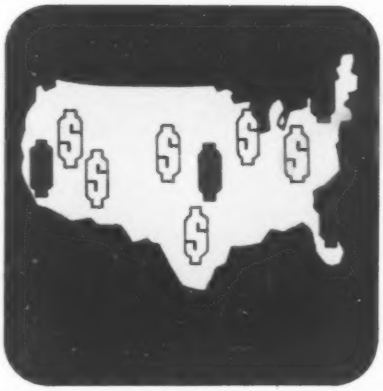
(Continued from page 121)

7.8 percent. (A year ago, the median increase was 9.1 percent.) Promotions accounted for 6.7 percent of the increases.

How did your raise last year stack up? One in six of the respondents who received a raise got less than 5 percent. One in three received a raise of between 5 and 7.9 percent; for one in four, it was 8 to 10.9 percent; and for one in 10, 11 to 13.9 percent. Only one in eight respondents got 14 percent or better.

These figures tell only part of the story, however, because at the same time, the rate of inflation has been relatively low. Thus, earning power has been increasing more rapidly than the raise statistics first seem to indicate. In 1980, the Consumer Price Index, a popular measure of inflation's impact on the cost of living, increased 12.4 percent, according to the Bureau of Labor Statistics. The CPI subsequently slowed 8.9 percent, and for the first 11 months of last year, the CPI rose at a rate of 3.9 percent.

Of course, there were the unfortunates who suffered pay reductions. Of those, surely one of the saddest cases was the manager in charge of MIS for a Missouri manufacturer with annual sales of between $10 million and $25 million. The manager reported a modest income of between $15,000 and $25,000. That's partly explained by the comment he added to his questionnaire: "All employees took a 28 percent pay cut because of the recession."



These figures give you some idea of what you can expect as you plot your next move. Increased salary is the most important factor in most managers' decisions to accept positions with other employers, as indicated by the survey. Eighty-three and one-half percent would leave their jobs for more money. How much is enough? Two in five managers would demand between 20 percent and 25 percent more before they'd accept a new position. One in six would demand 26 percent or more. And one respondent, an MIS/dp officer in Houston earning a Texas-scale $100,000 salary, would want even more. To move, he'd need a salary increase of 29 percent or more and "a total package . . . so lucrative no sane person could turn it down. . . ." These demands seem to belie that manager's claims that he's eager to move.

Naturally, many a manager couldn't be hired away for a fatter paycheck alone. Some respondents look for the right mix of a salary increase, more benefits, and improved working conditions. A few couldn't be moved by any incentives—or might accept *less* pay to get into the right job. One manager in his 50s who hadn't received a pay raise in the period covered by the survey was unfazed. "I'm perfectly happy with where I am and would rather retire than relocate," he wrote. But then he has the good fortune to be working in La Jolla, CA, an affluent oceanside suburb of San Diego.

A young dp manager, earning between $25,000 and $30,000, took a pay cut when he changed employers and locales. "I got away from the Boston rat race," he said. "I'm very happy in upstate New York. Money isn't everything!"

Of course, values vary from manager to manager. Money may not be everything, but your compensation patterns over the past few years provide insight into how fast you're progressing toward your professional goals. You've got a lot invested in your career, and after seeing these salary figures—to paraphrase New York City Mayor Ed Koch—how're you doin'? ☐

Inside story

This year's *Computer Decisions* Salary-Status Survey tapped the largest sample in the survey's five-year history. Abbott, Langer & Associates, a consulting firm, mailed forms to 20,007 MIS/dp managers in 50 states and Puerto Rico. Each recipient received a personal questionnaire—which solicited answers to questions on working situation, status, compensation, and benefits—and a survey data sheet, which requested salary data on managers and staff members.

The responses included 1,529 personal questionnaires and 1,362 survey data sheets. In total, respondents sent salary figures on 14,000 positions, categorized under 35 job labels. The businesses and institutions represented reflected the actual mix of workplaces for *Computer Decisions* readers. Results were compiled on an Amdahl 470 V-8 mainframe.

Abbott, Langer & Associates mailed the questionnaires in August 1983 to randomly selected MIS/dp managers and directors—who constituted 45 percent of *Computer Decisions'* subscribers at that time. (The magazine's circulation then was 120,000; it has since risen to 160,000.) Recipients were asked to respond with data effective August 15.

The information presented in the article is but a small fraction of all data compiled. A complete report, entitled "Compensation in the MIS/dp field," is available for $195 from Abbott, Langer & Associates, Department CD, 548 First St., Crete, IL 60417. The phone number is (312) 672-4200.

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COMPUTER DECISIONS

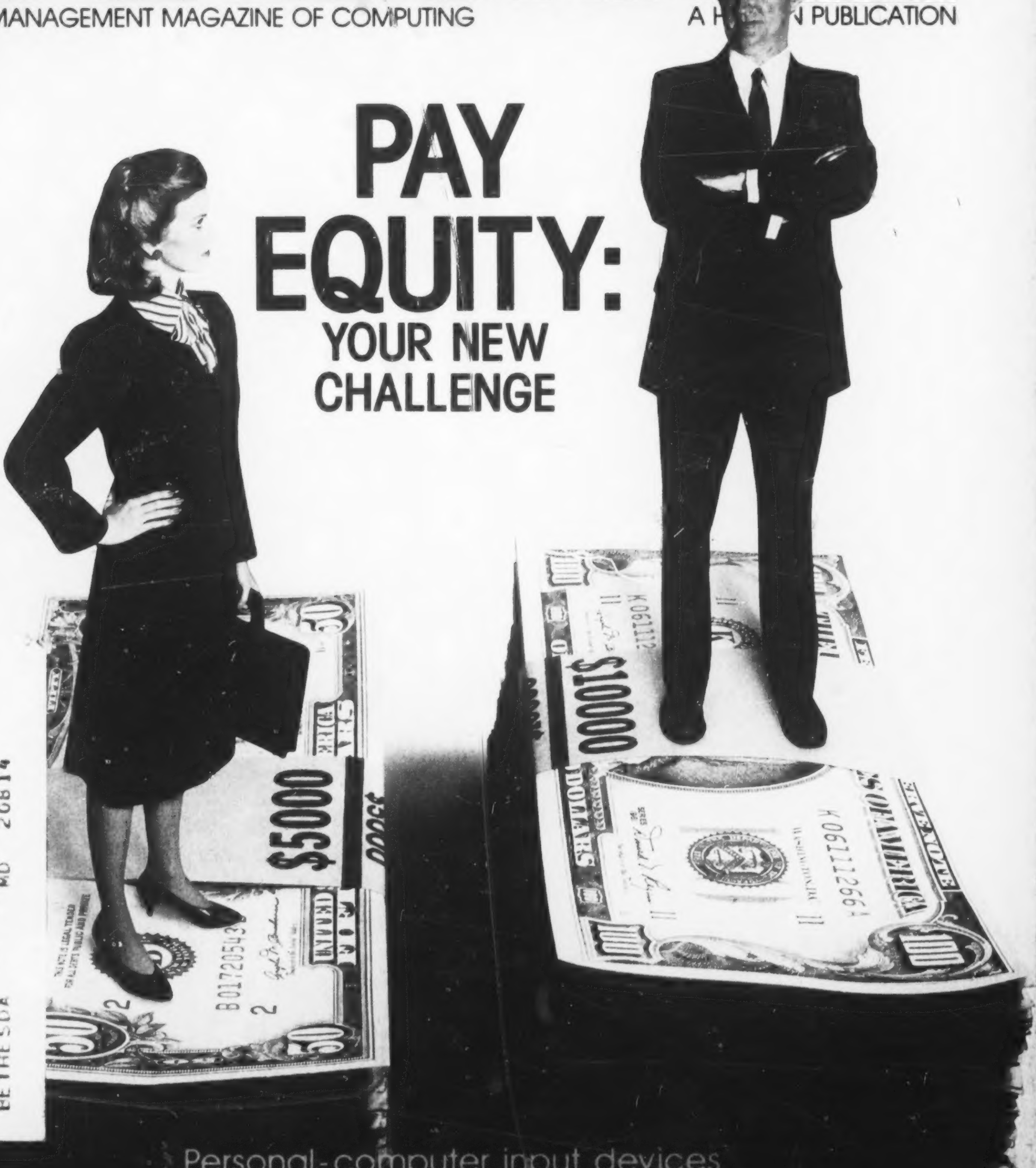
MARCH 1984

THE MANAGEMENT MAGAZINE OF COMPUTING

A H N PUBLICATION

PAY EQUITY:

YOUR NEW CHALLENGE



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Personal-computer input devices
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COMPUTER DECISIONS

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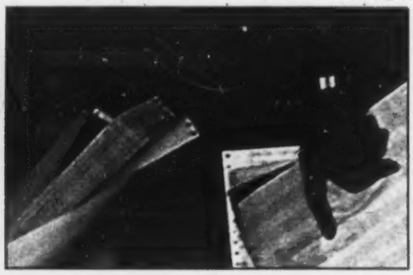

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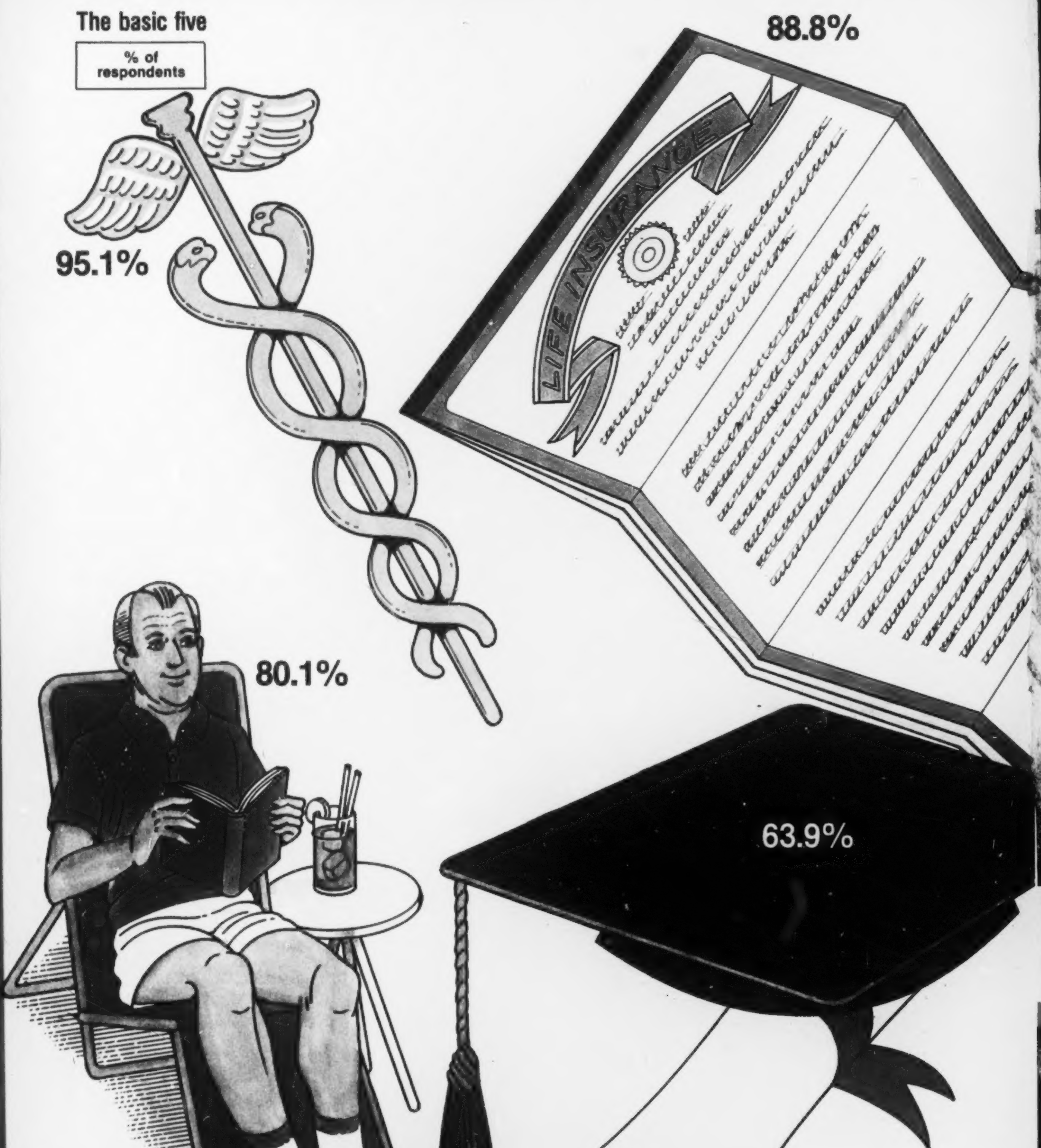


The basic five

% of respondents
95.1%
88.8%
LIFE INSURANCE
80.1%
63.9%

Illustrations by Everett Davids

SALARY-STATUS SURVEY, PART II

BENEFIT$: YOUR HIDDEN PAY

If you're looking for an easy second income, you may be overlooking the one you're getting right now.

by David Whieldon, Senior Editor

You don't have to be moonlighting to say that you're picking up a few extra dollars every week. You're probably receiving extra "pay" in a package of benefits and perquisites (perks) that your organization provides in addition to your salary. (Perquisites are privileges that go with managerial rank, and that often translate into genuine financial assets.) The value of these benefits can be substantial: According to compensation experts, it may equal up to 40 percent of the dollar figure you call your income.

Figures from *Computer Decisions'* fifth annual salary-status survey indicate that benefits and perks for dp executives are much the same as they were a year ago. They're very good, but a lack of marked growth indicates the continuing effects of the last recession. For instance, as of mid-August, 95.1 percent of managers and executives had medical-insurance plans, as compared to 94.1 percent a year earlier. And 2.8 percent of respondents enjoyed the privilege of organization-subsidized legal services, a tally that diverges only slightly from the 3.2 percent of last year.

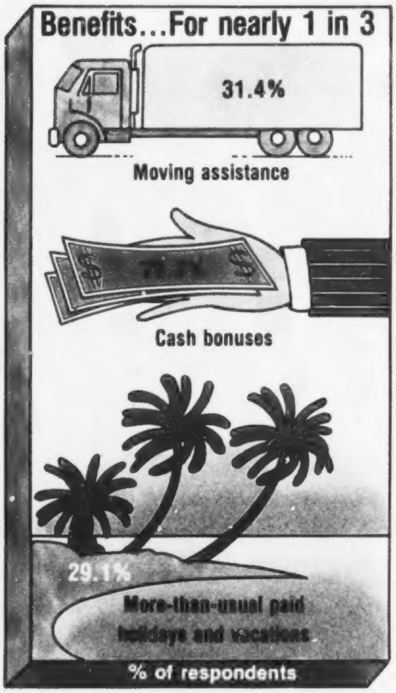
Using medical insurance as a starting point, you can quickly compare your benefits to those that most of the 1,529 survey respondents receive. Second-ranking was life insurance: Nearly nine out of 10 have that benefit. Close behind came pension plans, a benefit for four out of five. A bit lower on the scale were education assistance, which nearly two-thirds of respondents receive, and dental insurance, a benefit for three-fifths.

The implication is clear: Those doing well when it comes to benefits are getting at least these basic five, and probably some others. Over the past three years, the majority of survey respondents have consistently indicated that these core benefits are a part of their packages. And the proportion of respondents receiving each has hardly changed, showing that managements generally have not been extending pension, insurance, and education benefits to those who didn't have them before.

Your chances of getting more of the foremost five increase, of course,

Benefits Survey

(Continued from page 91)



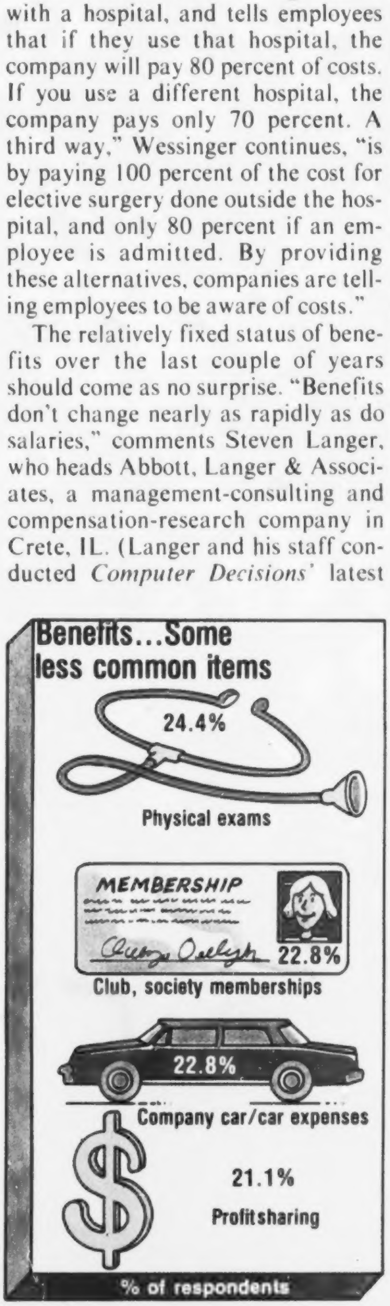
when your salary increases. With medical and life insurance, pension plans, and education assistance, the likelihood of getting more goes up only modestly. But dental insurance is an exception: Of MIS/dp managers with salaries of $25,001 to $30,000, 46.1 percent have dental plans, whereas 67.7 percent of those earning $50,001 to $60,000 have them. There are also marked increases in six other benefit categories when salaries go up.

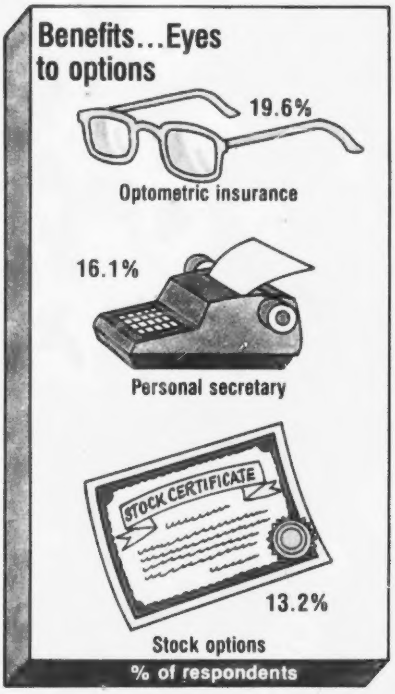
Some organizations have started trimming the basic benefits because they are costly. One trend, according to Hay Group, a compensation-research organization in Philadelphia, is to raise deductibles on health insurance from $100 to $150 or $200, transferring a larger share of the cost to employees. Nearly 40 percent of the companies that Hay surveyed reported taking such action.

W. David Wessinger, vice president of compensation services at Organization Resources Counselors Inc., New York, also sees many companies cutting health-care costs and explains ways some go about it.

"One way some companies cut costs," he says, "is by freezing the amount they pay for health care, and having employees contribute above that level. Another way is by arranging with providers to reduce costs. For example, a corporation makes a volume-discount agreement with a hospital, and tells employees that if they use that hospital, the company will pay 80 percent of costs. If you use a different hospital, the company pays only 70 percent. A third way," Wessinger continues, "is by paying 100 percent of the cost for elective surgery done outside the hospital, and only 80 percent if an employee is admitted. By providing these alternatives, companies are telling employees to be aware of costs."

The relatively fixed status of benefits over the last couple of years should come as no surprise. "Benefits don't change nearly as rapidly as do salaries," comments Steven Langer, who heads Abbott, Langer & Associates, a management-consulting and compensation-research company in Crete, IL. (Langer and his staff conducted *Computer Decisions'* latest salary-status survey.)





For some respondents—those in certain economic sectors and areas of the country—benefits have always been sparse. One manager in a mountain state writes that "benefits in government jobs are poor compared to those in private industry." An assistant dp manager in the wholesale/retail trade marks off only reimbursement for car expenses as a perk, and adds, "That's it!" Even two managers in manufacturing, where benefits are usually generous, claim they get none.

Whither perks?

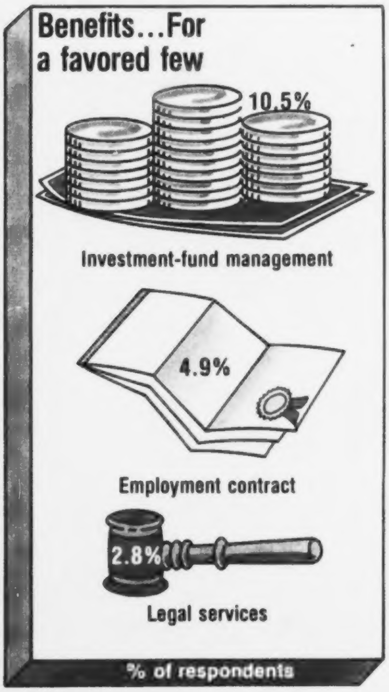
The privileges on the chart "Benefits, perks that grow with salaries," which accompanies this article, may indicate higher status. You score extra career points if you share in any of them. You get even more points if the benefits are generous.

Employer-paid moving expenses, cash bonuses, and more than the usual number of paid holidays or vacations are the most commonly received perks among all execs; about 30 percent reported getting them. (One

(Continued from page 92)

MIS manager with an insurance carrier says he works a four-day week.) About one manager or executive in four gets free physical exams, club or society memberships, or a company car or car-expense reimbursement. Profit sharing and optometric insurance go to approximately 20 percent.

Profit sharing holds a lot of appeal for one MIS/dp director, James B. Savitz, of Howard Publications in Carlsbad, CA. (Howard's newspaper and TV operations produce more than $100 million annually in sales.) Savitz's dp center, which is treated as a regulated utility, produces profits in which Savitz shares—and that's an arrangement he relishes. "An employee in management is motivated in a different way than others in the organization," he writes. "That person could make a million-dollar difference in the bottom line. I'm compensated according to how much responsibility I can handle and how efficient my operation is. Not how big, but how efficient. With this kind of profit sharing, I should come out way ahead of my peers who have run-of-the-mill benefits."


Benefits...For a favored few

What's happening with salaries?

Part I of "Salary-status survey," published in February, showed modest but steady increases in direct compensation. Here are a few highlights from that report:

- **The median salary for a top MIS/dp officer was $40,000; pay for a typical dp manager was $33,280.**
- **Nearly four-fifths of respondents received pay increases between Aug. 15, 1982 and Aug. 15, 1983, the majority without changing jobs.**
- **Increases typically amounted to 7.8 percent of salary. More than three-fourths of respondents received raises of 10.9 percent.**
- **Salaries for top MIS/dp officers in banking and finance were the highest (the median was $46,620); followed by manufacturing, processing, and extracting; health services; merchandising; government; and education.**
- **Top MIS/dp officers in the Pacific states earn the most (the median was $42,426), and those in the mountain states the least ($36,310), when salaries of respondents working in urban areas are included.**
- **Altogether, MIS/dp managers consider their salaries slightly below par when comparing them to salaries of other managers with comparable responsibilities.**
- **In the final analysis, respondents say, they're more satisfied than dissatisfied with their jobs.**

Only one MIS/dp manager in six has a personal secretary. Even fewer get stock options, investment-fund management, employment contracts, or free legal services.

As with the basic five, the percentage of managers enjoying these perks has changed little from the previous year. "Perks are very important," says W. David Wessinger. "But there's not much of a trend toward expanding them."

What about cash bonuses? As indicated in the salary portion of the survey, cash bonuses amounted to relatively little. For the top MIS/dp officer, a bonus and other cash benefits typically added just under $1,000 to direct income; for the dp manager, $720. (These are the median, or middle, figures reported by respondents.)

Cash bonuses are also listed with perks and benefits in the accompanying charts. Generally, 29.3 percent of respondents received them this past year; 22 percent of those making between $25,001 and $30,000 received them, and 47.7 percent making between $50,001 and $60,000 received them. These percentages have varied very little over the past few years.

Most of the benefits and perks listed are familiar. But some respondents enjoy a few very special and not-so-commonplace items.

- "Unlimited free air travel"—Dp manager at a municipal airport in Maryland
- "Terminal installed in my house at company expense"—South Dakotan in charge of dp
- "Free lunches"—MIS manager in Iowa
- "Matching, tax-deferred savings"—MIS manager for New England manufacturer
- "Forty percent discount on clothing"—Dp manager for California merchandiser
- "Tax-return preparation"—Dp manager for Colorado financial institution
- And what many managers and executives yearn for, at least in bad moments: "Very low pressure"—Dp manager in a nonprofit organization in Philadelphia

(Continued on page 96)

(Continued from page 94)

Nine out of 10 respondents say they'd move to another organization if the incentives were good enough. A higher salary would do the trick for 83.5 percent; bonuses for 43.3 percent; profit sharing for 42.4 percent. Working conditions count for something, too—three out of five say they're looking for greater challenges.

About one-third of the managers say that company cars or car allowances might entice them to move. One-third also checked off improved retirement plans, and one-fourth, increased medical-dental benefits. Finally, 22.2 percent say that reimbursement for moving expenses would influence them.

Though education assistance is a common benefit, and 63.9 percent of managers report having it, several others write it in as something they want and for which they'd move. "An employment contract and additional vacation days and holidays" are the desires, along with nine other items, of an assistant dp manager in Houston who earns between $60,000 and $70,000 a year. Perhaps the most unusual motivator—and it's a benefit in her eyes—is added by an MIS manager who makes well over $30,000 yearly. "Being a female under 30," she writes, "I'd look for an organization with more women in an established management network."

How do respondents see their own benefits, perquisites, and incentives in comparison to those of others with similar responsibilities? The typical response is that their benefits are about the same as other managers'. And when asked if they're content with their jobs, 54.7 percent indicate that they're either somewhat content or quite content.

It's obvious that for almost all MIS/dp managers, benefits and perks are important elements in the compensation picture. So it's to your advantage to figure out exactly what you have, and to negotiate for more when the opportunity arises. Sometimes, you can improve your earning power without actually getting a boost in salary. ☐

How the survey was done

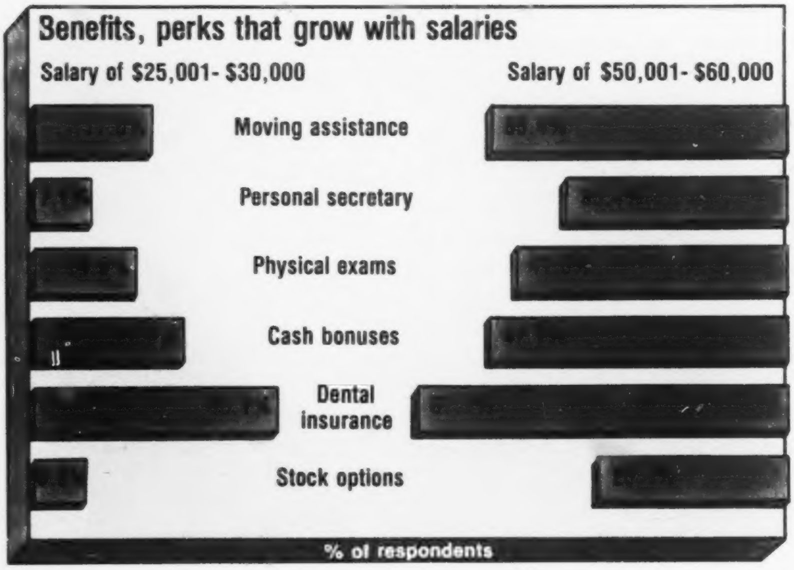
Readers of *Computer Decisions* returned 1,529 personal questionnaires out of 20,007 that were mailed in August 1983. That's the largest batch of questionnaires sent out in five years of surveying, as well as the largest response. Data from the returns have been incorporated into parts I and II of this article. (Part I appeared in last month's issue.)

The survey was made more comprehensive due to a collaboration between *Computer Decisions* and Abbott, Langer & Associates, a personnel, compensation, and psychological consulting company in Crete, IL. "The survey is the most exhaustive in MIS/dp," says Steven Langer, who heads the organization. "In the statistical field, the size of the sample is important, because the number of responses affects reliability and validity."

A personal questionnaire and survey data sheet on salaries and demographics went to each MIS/dp manager randomly selected from *Computer Decisions'* circulation list. (These managers made up 45 percent of *Computer Decisions'* circulation, which was 120,000 at the time.) Recipients hailed from all 50 states and Puerto Rico. Not all who returned the questionnaires answered all the questions, but most did.

Findings for both parts of the survey indicate medians—the middle figure in a lowest-to-highest array. Statisticians generally regard the median as the most accurate indicator of "central tendency"—and a better measure than average or mean, which can be more easily distorted by a few very low or very high figures.

Only a portion of the salary data was published last month in Part I. The complete report, which includes salaries for 35 different jobs, from top MIS/dp officer to junior key-entry operator, over seven regions and 25 metropolitan areas, is available for $195. The 346-page document, entitled "Compensation in the MIS/dp field," can be ordered from Abbott, Langer & Associates, 548 First St., Crete, IL 60417. The company's phone number is (312) 672-4200.



Benefits, perks that grow with salaries

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Corporate Executives' Guide To Personal Computing

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COMPUTER DECISIONS
MARCH 15, 1984
THE MANAGEMENT MAGAZINE OF COMPUTING
A HAYDEN PUBLICATION

Managers Rate The Major Micros

Our informal poll reveals the winners and losers in the race to be the most popular corporate micro.

User Autonomy Vs. Corporate Authority

Now that employees have micros, how can you direct them toward a goal without stifling innovation?

Micro Uses, Misuses, and Mistakes

Personal computers are remaking the workplace, but executives must ensure the changes are for the best.

Alternative Avenues To Personal Computing

The best way to provide personal-computing power may be without personal computers.

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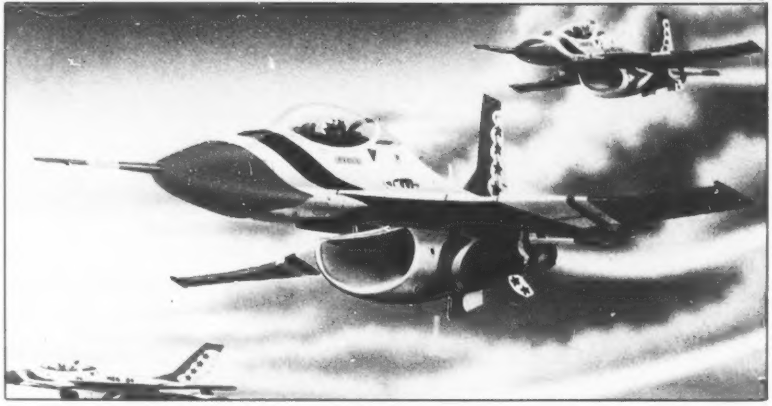

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25 MANAGERS RATE MAJOR MICROS

by Jordan Gold

Are the top personal computers all they're cracked up to be, or are IBM, Apple, DEC, Xerox, and the rest of them little more than designer labels? A poll of 25 managers, conducted by *Computer Decisions* with the help of the Microcomputer Managers Association, suggests that when managers acquire a corporate personal computer, they don't expect to get the perfect machine. Rather, they buy a micro that satisfies one or two corporate requirements.

For example, not all of the respondents whose organizations have IBM Personal Computers are happy with them. Many managers bemoan the fact that its keyboard departs from the standard IBM-typewriter layout. Others complain about the inadequate networking and mainframe-communications software available for the machine (although there is more communications software for the PC than for any other micro) and the relative incompatibility between the different versions of PC-DOS, the machine's operating system. Other faults cited include the single floppy-disk drive in the hard-disk version of the IBM PC, the PC XT; and IBM's inadequate support of such early software as Easywriter 1.0, a word-processing package, and Fortran compiler language.

Yet the IBM PC is a favorite among corporate managers, and it wouldn't have attained that status if it didn't offer a number of outstanding characteristics and business advantages. Several of the respondents to the poll considered the PC's expandability and memory capacity major attributes. The vast number of third-party vendors, providing everything from memory and add-on boards to disk drives and cooling fans, also enhances IBM's popularity.

The survey indicates that some managers didn't choose the IBM PC for its overall quality or special features, but for the intangible benefits tagged onto the name IBM. One overwhelming benefit is the wealth of good business software available for the IBM PC. "No machine is head and shoulders above any other in features or price. My company's choice, the IBM PC, doesn't even represent the best hardware available," says Howard Ingram, personal-computing specialist for the Collins Transmission Systems division of Rockwell International

TING SURVEY

Photo by Bob Ward

A poll of managers gives the IBM Personal Computer some high marks and some low marks. How do they rate the personal computers you have?

Inc., Richardson, TX. "However, the wide variety of software developed for it more than compensates for its shortcomings."

For another manager, knowing he'll be able to count on IBM for service and support 10 years from now is reason enough to buy its personal computers. "None of the personal computers available really meets my company's needs, and so I go with IBM for security," he explains.

Intangibles are important when managers choose one personal computer over another. For some users, owning an IBM is a matter of prestige. "It's those three letters," one respondent comments. "None of the executives in my company even thought about using a personal computer until IBM came out with one." And as another manager puts it, "Many executives think the IBM PC looks impressive on their desks."

For whatever reason, and despite the drawbacks, 17 of the 25 managers surveyed have chosen

"There were many problems with the Apple III in the beginning, and it's too late for a comeback." Belfer, Chase Econometrics/IDC

the IBM Personal Computer as their corporation's standard. The managers in the poll represent major corporations in a variety of industries. (The poll was conducted by telephone and was never meant to be a "scientific survey.") Of these managers, six had installed fewer than 10 computers, five had installed between 11 and 50, another five had between 50 and 100, and three had more than 100. The other personal computers favored in as many as two companies were the Xerox Model 820 and the Apple II.

The personal computers mentioned most often as second choices are two models that have been around awhile. The Apple II was listed as the second-most-used personal computer in eight organizations, half of which own more than 10 personal computers; the Tandy/Radio Shack TRS-80 was the second choice of five companies, three of which own more than 10 personal computers. Ford Motor Co., Dearborn, MI, uses more than 400 IBM PCs, Apple IIs, and TRS-80s in its overseas operations. (Ford's standard personal computer in domestic operations is the Victor 9000.)

For most of the respondents, Radio Shack and Apple computers represent early standards. Organizations that have been using personal computers generally started with the Apple II or the Radio Shack TRS-80 Model III and graduated to the IBM PC or a look-alike. "The IBM PC is more expandable than the Apple," one manager comments. "It has more memory capacity and more features like upper- and lower-case letters, high resolution, a lot of disk storage, and a built-in numeric keypad."

One computer is highly regarded by some respondents, even though it isn't a favorite in any of the organizations polled. That machine is the Apple Lisa. "Everything on the Lisa is a good example of what software ought to be like," declares Charles C. Hoerner, manager of office systems for McKesson Corp., San Francisco. For Hoerner, software should be easy to use. "Apple has done a fine job with Lisa," he says. "Unfortunately, because so little software is available, Lisa may never be a corporate success. Software creators will continue to beat their brains out in the competitive market for products that run on the IBM PC."

The Apple III, successor to the Apple II, was barely mentioned by respondents. One respondent suggests that the problems that attended the machine's introduction in 1981 are responsible for its lukewarm corporate acceptance. "Apple blew the introduction of the Apple III," says Don Belfer, vice president of computer systems for Chase Econometrics/Interactive Data Corp., in Waltham, MA. He believes the Apple III is still struggling with the poor reputation it earned during its early days. And now that the bugs are finally being worked out, users are implementing more powerful 16-bit personal computers, against which the 8-bit Apple III can't really compete. "There were so many problems with it in the beginning, and now it's too late for a comeback," he says.

Many of the respondents say they and their organizations have cautiously approached personal computing. Twenty-nine percent of the corporations represented have fewer than 10 of the computers designated as the

"Respondents are acquiring micros equipped with sophisticated tools and greater memory capacity."

standards. "We have only four IBM PCs," says James Fortney, manager of management-systems planning for Litton Data Systems, a division of Litton Industries (Van Nuys, CA). "But we only established the IBM PC as our standard two months ago. Besides, we're installing a big local-area network and want to make sure all equipment is compatible before it's installed."

Litton has ordered a dozen more IBM PCs, but Fortney considers the PC an interim machine. "We don't think any vendor has all the right answers," he says. "But because MS-DOS has become the de facto standard in operating systems, and because IBM has its own version (PC-DOS), the PC is our choice."

> *"Graphics software doesn't provide the high quality managers need."*
> *—Kneitel, Du Pont*

Managers in the poll most often mention limited networking and communications capabilities as the drawbacks of personal computers. "Managers want to use computers as multi-function terminals," asserts John Hart, manager of office systems for Avon Products Inc., New York. "They want their computers to communicate with each other and with the world but also to be versatile enough to stand alone."

Avon has made its more than 400 personal computers a major part of operations, according to Hart, and the Eagle Personal Computer, an IBM PC compatible, is the corporate standard. "We're very close to making our personal computers perform as multi-function terminals," Hart says. "We're in a pilot program with Digital Equipment Corp. using personal computers with a VAX 750 super-minicomputer. The VAX works almost as a controller, allowing the personal computers to exchange data."

Compatibility with an existing central computer has become such an important requirement that for many managers it answers the question of which machine is best. "We have

RATINGS OF 25 MANAGERS

	IBM PC/XT	Apple II/III	TRS-80 II/III	Victor 9000	DEC Rainbow	Honeywell MS 610	Xerox 820	Apple Lisa	Eagle PC
Preferred model	17	3	1	1	1	1	2		1
Ratings (1-5)									
Documentation	3.4	3.7		4	4		5	3	3
Ease of use	4	3.4		4	5	5	5	4	5
Return on investment	4.2	5		5			3.75	5	5
Productivity	4.18	4		5	3		4	3	3
Overall rating	3.95	4		4.5	4	5	4.4	3.75	4
	IBM PC/XT	Apple II/III	TRS-80 II/III	Victor 9000	DEC Rainbow	Honeywell MS 610	Xerox 820	Apple Lisa	Eagle PC
Preferred peripherals									
Disk drives									
Davong hard disk	2								
Manufacturer's	14	3		1			2	1	
Pegasus hard disk	1								
Tandon	1								
Tallgrass hard disk	1								
Printers									
Anadex	1	1							
C. Itoh		1			1				
Centronics		1							
DEC					1				
Diablo	1							1	
Epson	14	5							
Honeywell dot-matrix							1		
IDS	1								
NEC Spinwriter	3				1				
Okidata	4	1							1
Tandy			2						

IBM mainframes," says Fortney, "and using a single brand reduces maintenance problems." He adds that although the IBM PC is the standard at Litton Data Systems now, future personal computers by Wang Laboratories might be made a co-standard. Litton has Wang minis, as well as IBM mainframes.

Some of the managers in the poll base their personal-computer selections solely on their corporation's networking requirements. As Barry Pierce, manager of information-processing technology for Gilbert/Commonwealth (Reading, PA), says, "We want to build a network of personal computers, word processors, and large computers. Xerox micros meet our requirements. The Model 820 isn't the best personal computer, but it integrates into our system—and that's more important to us than [processing] speed."

The Xerox 820 is a building block in Gilbert Commonwealth's long-range plans for office automation. Its system will eventually comprise 100 workstations, including the Xerox 860 word processor and the 8010 Xerox Star word-processing system. "We chose Xerox computers for their abilities to communicate with each other, to use such Ethernet services as electronic mail, and to access high-speed laser printers," explains Pierce.

The importance of communications even shows up in the respondents' opinions of peripherals. Of the peripherals rated by managers in the poll, those that provided communications—the Irma communications board from Technical Analysis Corp. and Cullinet Software's micro-to-mainframe board—are receiving a lot of attention. "There's also a crying need for software that transmits information from DEC to IBM or DEC to Wang, and so on," adds Hart. "Modems are too error prone for the job."

All of the personal computers rated in the poll fare well in the key categories of ease of use, productivity, and return on investment, although several managers pointed out that the benefits of a personal computer sometimes cannot be measured.

Of course, ease of use, or user friendliness, is a relative term, and managers attach varying degrees of importance to it. "Ease of use is in the mind of the user," asserts Mayford L. Roark, executive director of systems for Ford Motor Co. "A third of any staff has a flair for computing and picks it up unassisted. Another third can be coaxed and trained. But a final third will always have trouble—they have an emotional resistance to the technology."

Does that mean user friendliness is a hoax? Not really. Some computers appear so difficult to use that both enthusiastic and reluctant users become intimidated and never learn to use them.

On a more specific note, Litton Data Systems' Fortney blasts IBM's selection of a nonstandard keyboard for the IBM PC. "I don't understand IBM's approach to the PC's keyboard," he says. "People who have been using the IBM 3270 terminal are lost when they sit down at the PC." The Apple II's keyboard isn't any better, he continues. "Apple has a truncated keyboard that doesn't

"Managers most often mention limited networking and communications as the drawbacks of personal computers."

have function keys."

Fortney believes a "shell," a feature that provides menus with user instructions or prompts, would be helpful on the IBM PC. "Wang requires front ends on all software written for its personal computers," he says. "Menus are better than memorizing commands. Not only are such systems easier to learn, they also are easier for an infrequent user to understand."

Despite the personal computer's highly touted ability to raise productivity, managers in the poll have a tough time quantifying increases. True, a computer may help an employee complete a task in less time, but it also permits more iterations of the task to be performed. The amount of time saved is not as important as what's done with it, the managers say. "Personal computers let you trade time for quality," says Gilbert Commonwealth's Pierce. "When a proposal is prepared manually, there's usually only enough time for one or two drafts. But the ability to easily write and rewrite on a personal computer lets a professional produce a more accurate and well-rounded proposal."

Playing devil's advocate, Pierce points out a problem associated with the greater capabilities personal computers give workers. "Let's say the computer prevents a $1 million mistake on a proposal. If your incorrect figures were a million dollars too low, the computer would have cost you money. If they were a million dollars too high, the computer would have made you money."

Computers provide a fast return on the money invested in them, largely because of their

(Continued on page 118)

RATINGS OF 25 MANAGERS

	IBM PC/XT	Apple II/III	TRS-80 II/III	Victor 9000	DEC Rainbow	Honeywell MS 610	Xerox 820	Apple Lisa	Eagle PC
Preferred applications packages									
Spreadsheets									
1-2-3	17						2		
Multiplan	4						2		1
Perfectcalc (Eagle Calc)							1		1
Report Manager (Victorcalc)				1					
Supercalc	1				1				
Visicalc	6	4	1						1
DBMSs									
Condor	1						2		
dBase II	4	2			1		1		1
DB Master		1							
Focus	2								
General Manager		1							
Infostar					1				
PC File									1
PFS:File/Report	1	1							
Profile Plus			1						
Sequitur	2								
TIM	1			1					
Visifile		1							
Communications packages									
3101 Emulation	1								
Crosstalk	2				1				
Manufacturer's	4						1		
PC/Intercom	1								
Saturn									1
Softerm		1							
Smartcom II	1								
Symware 3270A	1								

PERSONAL COMPUTING SURVEY

(Continued from page 114)

low cost. "Personal computers pay for themselves in much less time than our two-year payback standard," says Avon's John Hart. "In addition, although we're using the machines for the purpose we originally intended, users are taking them beyond our original expectations, providing us with an even better return on investment."

In the same vein, managers say what counts is not *how much* time is spent at a computer, but *how effectively* that time is spent. "It's like a telephone," says Rockwell's Howard Ingram. "You don't expect someone to talk on one for eight hours a day, do you?"

The poll suggests several trends in computer configurations. The respondents are acquiring personal computers equipped with increasingly sophisticated tools and greater memory capacity. Most of the machines typically have 256,000 bytes of main memory, two double-sided disk drives (or in an IBM PC XT configuration, one disk drive and a vendor-supplied hard disk), an Epson printer, a vendor-supplied monochrome monitor, serial and parallel ports, and a Smartmodem, from Hayes Microcomputer Products, operating at 300 or 1,200 bits per second.

However, computers purchased since the first quarter of last year suggest that managers have changed their equipment priorities. Those machines typically have 512,000 or more bytes of memory, color monitors, hard disks (often made by an independent vendor, since the PC XT has been in short supply), 1,200-bps Hayes modems, and Epson printers.

"Ease of use is in the mind of the user."
—Roark, Ford

"A third of any staff has a flair for computing. Another third can be trained. But a final third will always have trouble." Roark, Ford

What does this trend toward more-powerful, better-equipped systems mean? "Most of the new user-friendly software includes online help functions, which require a lot more random-access memory (RAM) than older packages," says Litton Data Systems' James Fortney.

Even managers who don't have machines with large memory capacities emphasize the need for more memory. "We've bought upgrades to the Xerox 820 to make it both an 8- and a 16-bit machine, with 128,000 bytes of RAM in the 16-bit version," comments Gilbert/Commonwealth's Pierce. Another manager says his employer is loading its Apple IIs with "as much memory as they can handle—96,000 bytes, 128,000 bytes, or whatever."

Epson is the most popular line of printers among the responding managers, perhaps because IBM markets printers made by Epson. (If one of the managers surveyed has the IBM or any other manufacturer-supplied printer, the charts tally the vote for its actual manufacturer, if known—Epson for IBM, C. Itoh for Apple, and so on.) Okidata's printer was mentioned as a favorite by several companies, and the NEC Spinwriter was used as a secondary printer for word processing. The Hewlett-Packard 7470A Plotter was the only plotter mentioned by the respondents.

The most prevalent applications in the organizations represented in the poll contain few surprises. Spreadsheet analysis and database management are the most popular personal-computing tasks. Few managers mention word processing, perhaps because of the widespread assumption that word processing is a clerical task and because many secretaries already use dedicated word-processing equipment.

Responses from the managers suggest, however, that word processors are becoming passe as more and more corporations begin using personal-computer word-processing software like Multimate from Softword Systems on their micros. "The word-processing packages for personal computers are getting better," says Charles Hoerner of McKesson. He doesn't doubt that personal computers will eventually mean the end of word processors, but only after another round of improvements for word-processing packages. "The software and keyboard still don't quite match the best of the dedicated word processors," he explains. "Before, when users needed word processing, we told them to buy a word processor. Now we steer them toward personal computers."

Accounting isn't a widespread use for personal computers in the corporations represented in the poll. Indeed, the managers discourage use of accounting packages on stand-alone machines, fearing the corporate books will be muddled.

Graphics is apparently an application that hasn't yet found favor in corporations. "Graphics software doesn't produce the high quality managers need for business graphics," complains Arnold Kneitel, systems consultant for E.I. du Pont de Nemours, Wilmington, DE. "We need more precision, greater resolution, and a smoother line."

Many of the managers in the poll complained about the dearth of computer furniture. "Furniture design and the amount of space in a personal-computing workstation are important issues," says James Fortney. "There's a tendency to reduce the space allotted to employees, but to increase productivity you have to equip them with tools, which take up space. There's a big need for office furniture designed to accommodate computers."

Although most of the managers agree with Fortney, few are using special furniture. "The return on investment isn't there with ergonomic furniture," McKesson's Hoerner comments. "How do you justify buying an $800 chair?"

When it comes to the best way to purchase computers, the managers are almost evenly divided between buying direct from manufacturers and buying from dealers. (Independent sales organizations aren't prevalent among the organizations represented in the poll, and turnkey suppliers aren't used at all.) Most firms are so uncertain of the advantages of either major purchasing strategy that they purchase from dealers *and* manufacturers—despite disappointing ratings for both. IBM, in particular, draws harsh criticism for the inferior quality of its sales support.

"We don't think any vendor has all the right answers."
—Fortney, Litton

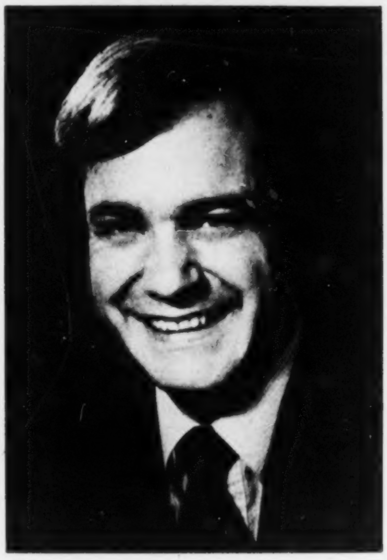
"IBM's pre-sale support is abominable," says Hoerner. "Sales reps in its product centers think they know everything, but they don't. One guy insisted to me that the Displaywriter (a dedicated word processor) couldn't communicate with the IBM PC. He was wrong, of course. Another time, we were put on the waiting list for some boards that were out of stock, but were never called when the boards came in. IBM should forget retailing."

Big Blue admits that the success of its personal computer has led to delayed shipments of computers and parts, but adds that the product centers will soon have streamlined supply lines. An IBM spokesman also divulged plans to set up a toll-free customer-service hot line.

(Continued on page 120)

RATINGS OF 25 MANAGERS

	IBM PC/XT	Apple II/III	TRS-80 II/III	Victor 9000	DEC Rainbow	Honeywell MS 610	Xerox 820	Apple Lisa	Eagle PC
Maintenance and support ratings (1-5)									
Hardware									
Dealer	3.2	4			5				4.5
Manufacturer	3			5		4	5		
ISO	3.5								
In-house	4.7								
Software									
Dealer	3.8								
Manufacturer	3.5	5		5	4		2		3
ISO									
In-house	5	5							
Training									
Dealer	3.6								
Manufacturer				5					
ISO									
In-house	4.4				4.5				



"IBM's pre-sale support is abominable. Sales reps in its product centers think they know everything, but they don't."
Hoerner, McKesson

(Continued from page 119)

The spokesman also insisted that "the only way an IBM PC and a Displaywriter can communicate is through a 5520 administrative system." Hoerner, however, maintains that "the connection is a trivial matter, involving a $750 interface, an asynchronous modem, and an acoustic coupler." This comes as no surprise, however. Most managers in the poll agree that none of the major computer manufacturers is helping to meet end-user needs. "That's understandable," Hoerner reasons. "The major vendors are pumping out iron. The really creative solutions are coming from software companies. Hardware manufacturers don't and shouldn't have the vision to market software solutions." (Of course, it can be argued that some hardware vendors are striving for better software solutions like those found on Apple Computer's Macintosh.)

Although many of the companies represented in the poll provide their own hardware support, most rely at least partially on their vendor's toll-free hot line for solutions to software problems. These phone services receive mixed reviews at best. Ashton-Tate's hot line for its dBase II database management system is "deplorable," asserts one manager, whereas Softword Systems' hot line for its Multimate word-processing package is called "outstanding" by another. Managers somewhat immodestly rate their own in-house support services as vastly superior to outside sources.

When asked which components break down most often, the typical response was, "Components really don't break down that often, but when they do it's usually the disk drives." The fact is, personal computers don't frequently break down. "Personal computers are much more reliable than mainframes," Hart says. "But they're so cheap we keep spares in case they fail."

Still, when the need for maintenance arises, many managers consider on-site maintenance their best option. The University of Arizona is one extreme—its micros for agricultural research are located in every county in the state. "On-site maintenance is an absolute necessity for us," comments Robert MacArthur, a systems analyst. "We can't afford to have personal computers shipped to a central location for repair."

"When managers acquire personal computers, they don't expect to get the perfect machine."

"No machine is head and shoulders above any other."
—Ingram, Rockwell Int'l.

McKesson Corp.'s circumstances are less extreme, but "We give all our Personal Computers on-site maintenance," Hoerner reports. "Employees take too much time to bring their machines back to the source for repair."

Corporations represented in the poll train employees themselves. Many have informal, one-on-one training or "neighbor help," as Rockwell's Ingram calls it. Some training programs are more extensive. A typical course includes an introduction to personal computers plus individual courses on each popular software package, like 1-2-3, Supercalc, or Wordstar. "We tried producing and distributing videotapes," Ingram says, "but it didn't work. An instructor is needed to answer questions. And the student needs to set the pace."

The subject of technical documentation was greeted by a managerial yawn in most cases. "Ninety-nine percent of our users never even bother to read the documentation," says Hoerner. "Reference guides are only important during training. Employees don't care about manuals," he says. "They want software packages that are self-explana-

"Seventeen of the 25 managers polled have chosen the IBM Personal Computer as their corporation's standard."

tory and have an online 'help' screen."

Avon has made its manuals a little more friendly, according to Hart. "The documentation is very good, but it's a little extensive," he says. "We put together a mimeographed set of instructions that reduces the size of the technical documentation nine-tenths."

All in all, the managers say they're pleased with their choices. But whether this satisfaction indicates that any one brand is superior is questionable. After investing a chunk of the company's assets in a product, a manager is unlikely to voice displeasure with any purchase, good or bad.

Most managers also report strong acceptance of their choices by employees, another claim that must be qualified. Pierce of Gilbert/Commonwealth believes employees will accept any machine. "If you walked everywhere and I bought you a car, you might suggest ways to make the car run better, but you'd sure be happier with it than you were without it," he reasons.

What conclusions can be drawn from the opinions of 25 managers? Certainly no product can be called "the best" or "the worst"—though the IBM PC can be safely dubbed "the most widely used." What can be gleaned from this survey is that selecting the right computer depends on your needs today, your long-range plans for networking and communications, and your requirements for software and peripherals. Look at the big picture before you commit your corporation to hardware. ☐

Jordan Gold is a Fort Worth, TX-based free-lance writer.

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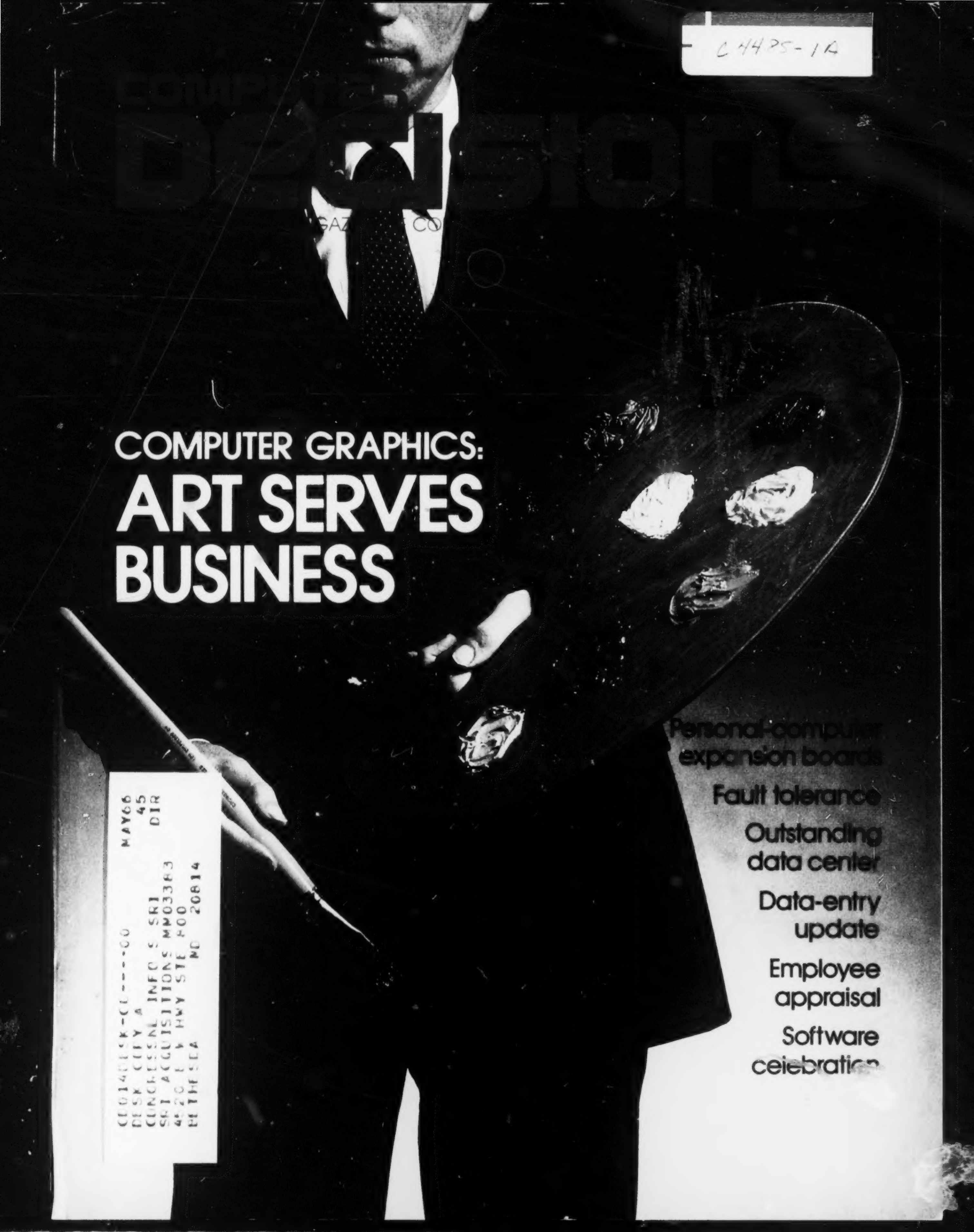

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THE MANAGEMENT MAGAZINE OF COMPUTING
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COVER PHOTO: Edward Hardin

OFFICE AUTOMATION

The vogue in OA is formality

Formality has become the key word in office automation. Although this is particularly true in giant corporations, even medium-sized and small companies are bringing institutional authority to bear on OA decision-making. The trend reveals a general belief that coherent, carefully conceived plans and procedures will successfully raise the output and effectiveness of office workers.

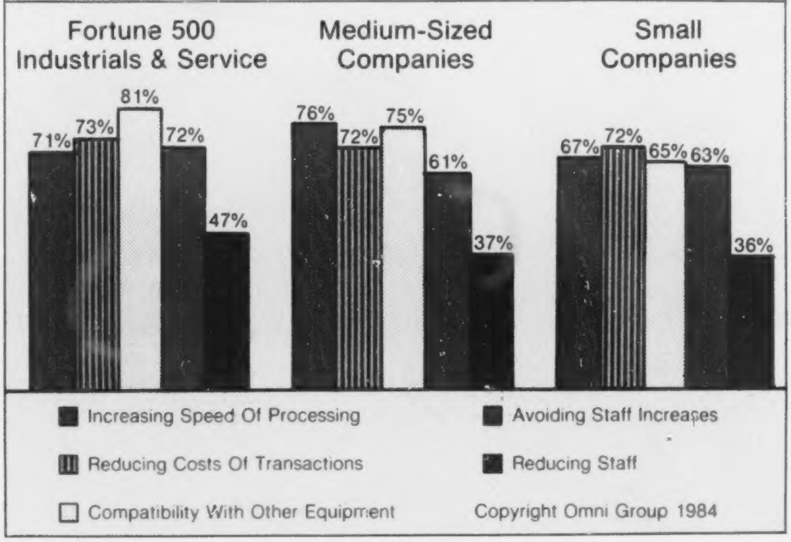
The movement toward formal plans and procedures in office automation is described in a new study by The Omni Group Ltd., an office-systems consultancy based in New York. "The Office Automation Challenge: American Business Responds" is based on interviews with nearly 850 managers responsible for planning or purchasing office systems in large, medium-sized, and smaller companies.

More than half of the nation's largest corporations already have strategic plans to automate their offices, according to the survey. By next year, almost 85 percent of the largest industrial and service corporations expect to implement plans governing the way word processors, personal computers, electronic-mail systems, and other OA tools are evaluated, purchased, and installed.

Management lends a primarily supportive role to OA efforts, especially in the larger organizations, but many players are involved in corporate planning and purchasing. In Fortune 500 corporations, OA policy is usually the responsibility of a special committee or a single department charged with creating a strategy, according to the survey results. In either case, the data-processing or management-information systems (MIS/dp) department plays a major role in formulating policies.

OA Purchasing Objectives

Percent of companies who answered "very" or "extremely important"



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When it comes to purchasing OA systems, the survey results suggest that users themselves have much of the authority. "The person who signs the check is not necessarily the one who writes the policy," notes Randy J. Goldfield, president of The Omni Group. The end user's important role is underscored by the significant amount of discretionary spending on OA outside of normal cost-justification procedures.

According to the survey results, data analysis is the most popular application of systems among managers and professionals. Data processing is next. In addition to data processing, transaction processing—tasks like order entry and inventory control—ranked highly among medium-sized and small businesses. "Outside of the Fortune 500, businesses can't support full-blown dp and office systems departments," says Warren Waldbrand, Omni's research director. "These functions seem to merge."

The survey also suggests that many of the most-heralded applications are not heavily used by many corporations. Electronic communications, for example, is regarded as a key application by less than 20 percent of the large corporations in the survey, and less than 10 percent of the small operations. Graphics, another much-touted application, also is not highly valued by corporations.

The survey results also suggest that staff reduction, a widely touted benefit of OA, is not vital to corporations. Rather, respondents want to raise the effectiveness and speed of office transactions. □

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TOP 100

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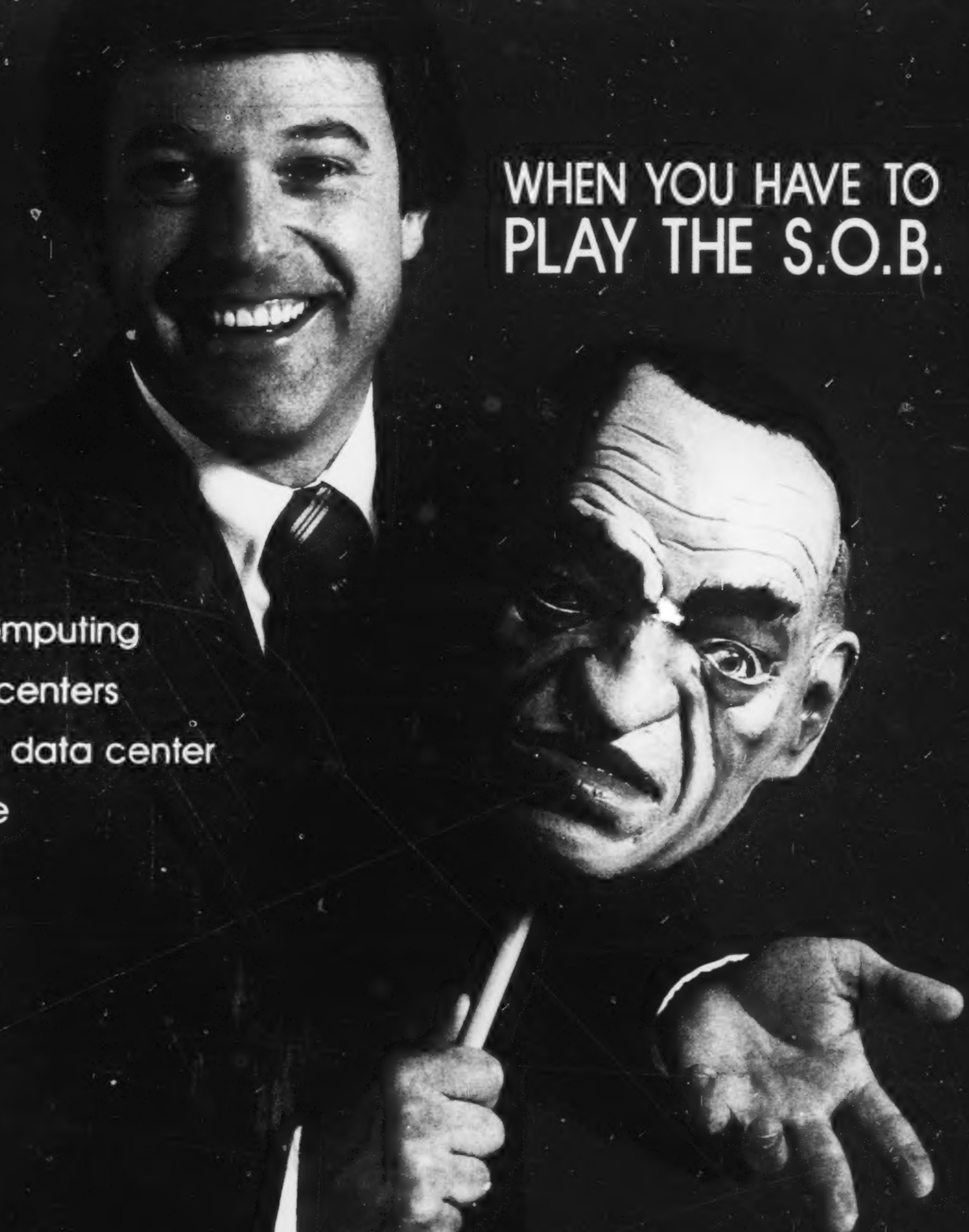
JUNE 1984



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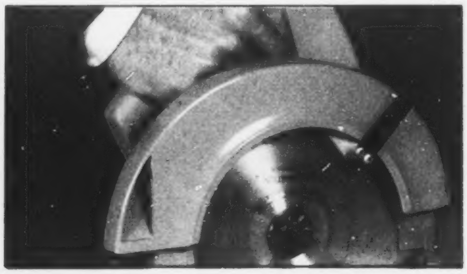
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COVER PHOTO: Ted Hardin

Edited by Joseph Braue, News Editor

news & comment

More advise than consent on micros

The role of most MIS/dp departments in the acquisition of personal computers and microsystems is to assist and advise, rather than to approve. Of 155 top-level MIS/dp executives responding to a recent survey, slightly more than half said their role is to advise, while 37 percent said it is to review and approve. Nearly one-quarter of the respondents believed their role encompasses both extremes.

The results of the survey by Newton-Evans Research Co., Baltimore, are included in "Microcomputer Usage Trends in Fortune 1,300 Corporations," a report.

Another key finding of the survey was the seeming dissatisfaction of MIS/dp executives with supermicrocomputers, defined as 16- and 32-bit multi-tasking systems supporting many terminals. Three out of four respondents said supermicros are unnecessary. More than one-third (36 percent) indicated that they have no supermicros and no plans to purchase them. Only 15 percent said they have supermicros, and 26 percent expected to acquire one or more by the end of next year.

The respondents also downplayed the importance of portable computers. Nearly one-half (48 percent) said they don't envision widespread use of portables in businesses. Eighteen percent said portables would play a major role in corporations, and one-third were unsure. Portables will mostly be used by sales representatives, systems analysts, and professional users who are not managers or clerical workers, according to the respondents. But some executives, managers, and clericals will also use the machines.

Other findings include:

- By the end of 1985, about 420 microcomputers will be installed in the average Fortune 1,300 corporation.
- About 52 percent of these desk-top personal computers will be assigned to professionals. Executives and managers will have about 23 percent and clerical staff members will have the remainder.
- The biggest fear about personal computers in Fortune 1,300 companies is the possibility of security or privacy breaches (cited by 44 percent of the respondents).
- Long-term "supplier viability" is the most powerful influence on microcomputer selection. Others are "connectability" (cited by 47 percent) and "software availability" (33 percent).

The microcomputer manufacturer represented in the most responding corporations was—you guessed it—IBM. Of 155 respondents, 142 reported owning IBM micros. Two-thirds of the respondents said they had no plans to buy personal computers from other suppliers.

Newton-Evans also asked the respondents about acquisition policies. Twenty-three percent said their organizations don't have an effective personal-computer-acquisition policy.

The most frequently mentioned microcomputer application was spreadsheet analysis, cited by 95 percent of the respondents. Word processing, mentioned by 91 percent, ran a close second. Business graphics was the third most frequently mentioned application. Micro database management systems (DBMSs) are also important to many corporations (60 percent), but more than one-quarter of the respondents said micro DBMSs are unnecessary.

The 250-page report costs $750. For information, contact Newton-Evans Research Co. at (301) 465-7316.

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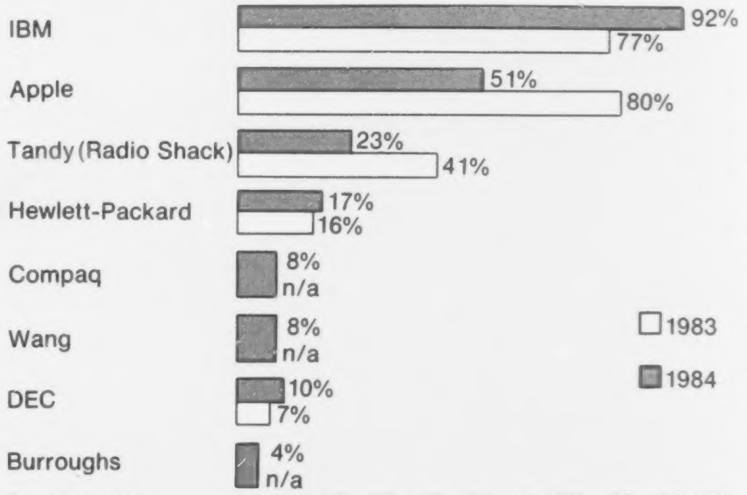
Favorite corporate micros



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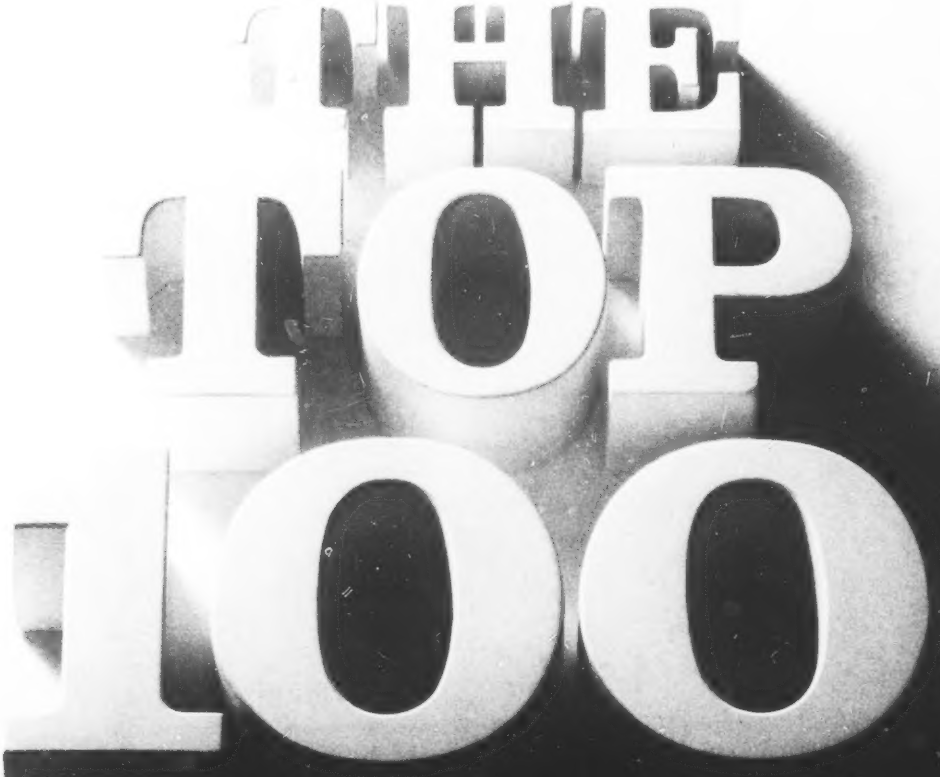

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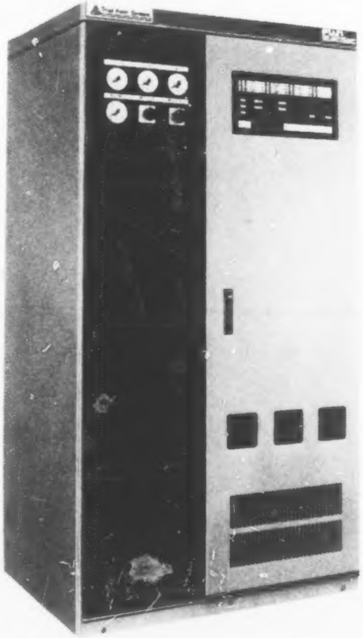

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- **Increased capacity and redundancy** . . . available with optional parallel configuration.
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CIRCLE 101

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G42 Index to the Top 100

After a disappointing start, the Top 100 dp vendors roared back to set new records for revenues.

by William Cappelli

As the economy picked up momentum last year, data-processing vendors—leaders among high-technology businesses—went on a roll. Growth, in terms of revenue, was impressive—phenomenal for some corporations. Suppliers of computer hardware, software, and services were ready to cash in on the increased demand for capital goods and processing power spurred by the robust economy.

The major developments of 1983 included the resurgence of the original-equipment manufacturers (OEMs), fueled by a surging demand for data storage, and the start of a shakeout of personal-computer manufacturers. Several crucial strategic errors by microsystem vendors and the powerful lure of IBM standardization contributed to an upheaval in the personal-computer segment. IBM emerged with the lion's share of the market. Indeed, for the first time, IBM's revenues from personal-computer sales surpassed those of Apple Computer.

Led by IBM, the 100 largest vendors in dp recorded aggregate revenues of almost $91.06 billion (Table 1). The aggregate total represents a nominal increase of 16 percent over the $78.1 billion aggregate recorded by the 1982 edition of the Top 100 (the two rosters are not identical). The gains made by dp's Century Club are even more impressive in light of the disappointing first-half results many reported. Most suppliers registered gains in 1983 only during the last two quarters.

This year's 100 top dp vendors registered a 16.7 percent nominal increase over their 1982 aggregate results of about $78 billion. Adjusting these results for inflation (using the

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This is the fifth edition of Gartner Group's list and analysis of the Top 100 data-processing vendors—the third one that has appeared exclusively in Computer Decisions. *Copyright 1984 by the Gartner Group, Stamford, CT.*

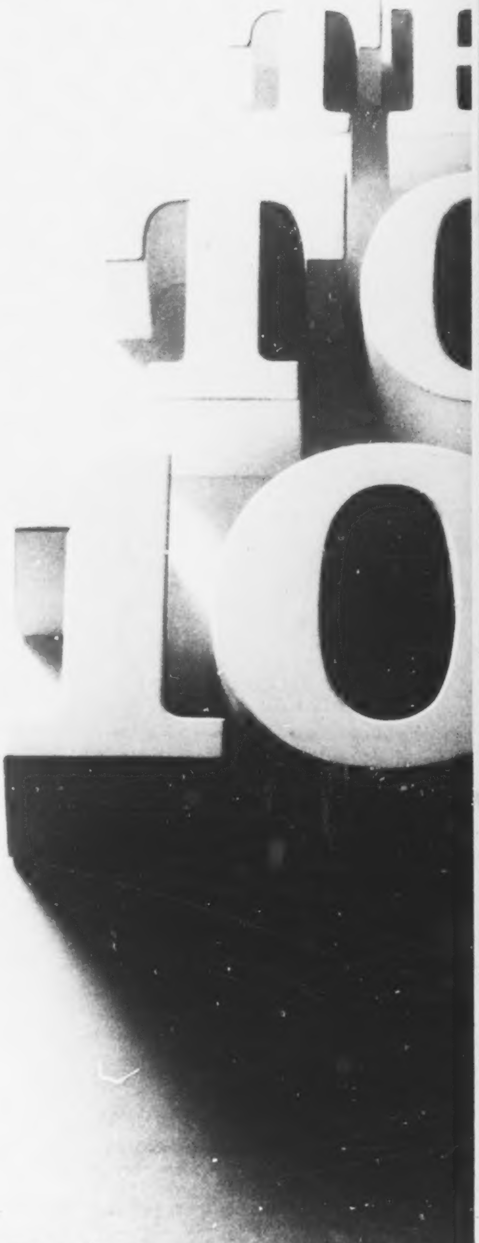

Photo by Bill Oliwa

federal government's formula), the Top 100 of 1983 grew by 13 percent in real terms. In comparison, the gross national product grew a mere 3.4 percent in real terms during the same period.

The narrowing of real- and nominal-growth rates evident in the 1982 results continued last year. The 1982 edition of the Top 100 registered a 16.8 percent real-growth rate and a 20 percent nominal rate, compared to this year's 13 percent real rate and 16.7 percent nominal rate. These figures suggest that although the dp industry has continued to expand at a healthier rate than other segments of the economy, it is becoming more closely integrated with the rest of the economy and more sensitive to business cycles. However, if the Top 100 is more vulnerable than before to recession, it won't feel the pinch for at least the next year, as the economy continues to boom.

The cutoff point—in revenues—for admission to the Top 100 leapt an incredible 31 percent for the 1983 list. The last vendor on the list in 1982, American Management Systems, recorded revenues of $70 million. That vendor isn't even on this year's list, and Cipher Data Products, which checked in at No. 100, registered $92 million in revenues.

As might be expected, several corporations were unable to keep up with this breakneck pace. Nine companies fell from the Top 100 during the course of 1983, up from three during 1982. Sundata, ModComp, McGraw-Hill's DRI subsidiary, Comshare, Systems Industries, Bradford National, Lear-Siegler, Anacomp, and Triad failed to generate enough dp business for inclusion on this year's roster. No companies were lost to acquisition—a somewhat surprising development in a merger-mad year—but this situation will change in 1984. Lanier and Harris completed a merger in late October (so they are listed separately in this report), while McDonnell Douglas is acquiring Tymshare.

Newcomers to the ranks of the Top 100 include Compaq, a Houston-based manufacturer of IBM PC-compatible portables. It was cata-

(Continued on page G10)

Table 1

The Top 100 *U.S.-based vendors, ranked by 1983 dp revenues (Dollars in millions)*

Rank					Dp revenues			Growth
'83	'82	'81			'83	'82	'81	'83/'82
1	1	1		IBM	$37,367	$31,467	$25,111	18.7%
2	2	2		DEC	4,826	4,019	3,586	20.1
3	3	6		Burroughs	4,038	3,809	2,478	6.0
4	4	3		Control Data	3,507	3,301	3,120	6.3
5	5	5		NCR	3,040	2,838	2,714	7.1
6	6	4		Sperry	2,799	2,802	2,775	-.1
7	7	7		Hewlett-Packard	2,518	2,268	1,875	11.0
8	9	9		Wang Labs.	1,792	1,321	1,008	35.6
9	8	8		Honeywell	1,666	1,685	1,774	-1.1
10	10	11		Xerox	1,222	1,050	872	16.4
11	19	22	⇑	Apple Computer	1,084	663	400	63.4
12	13	12		TRW	1,015	825	855	23.0
13	26	45	⇑	Commodore Int'l.	969	420	176	130.8
14	16	19	⇑	Tandy (Radio Shack)	945	725	460	30.4
15	14	13		Data General	867	803	764	7.9
16	11	10		Storage Technology	860	1,030	890	-16.5
17	17	17		Automatic Data Processing	816	712	624	14.6
18	12	14		General Electric	800	850	735	-5.9
19	24	21		Amdahl	777	462	442	68.3
20	15	15		Texas Instruments	739	746	640	-1.0
21	18	16		Computer Sciences	718	683	624	5.2
22	20	18		Electronic Data Systems	694	555	480	25.0
23	30	25		Management Assistance	559	354	349	57.9
24	21	20		Datapoint	554	513	452	7.9
25	23	26		McDonnell Douglas	542	474	346	14.4
26	25	24		Prime Computer	516	435	364	18.5
27	22	44		Motorola	514	484	180	6.0
28	27	27		National Semiconductor	486	387	320	25.7
29	33	36	⇑	Tandem Computers	450	330	242	36.1
30	28	23		Teletype	437	377	368	15.8
31	36	33		Computervision	400	325	270	23.0
32	40	37		Racal-Milgo	387	300	240	29.0
33	29	28		Mohawk Data Sciences	384	355	314	8.1
34	35	42	⇑	C.Itoh	360	326	213	10.4
35	38	31		Dataproducts	352	318	289	10.5
36	54	84	⇑	Tandon	343	177	70	94.2
37	32	30		Tektronix	338	336	309	.7
38	37	32		Gould	334	325	280	2.8
39	45	41		3M	330	223	220	48.0
40	34	27		Triumph-Adler	330	327	320	.9
41	31	29		Harris	327	344	313	-5.0
42	32	34		Raytheon	302	336	260	-10.1
43	41	38		Tymshare	288	297	235	-2.8
44	39	67		Warner Communications	281	310	115	-9.4
45	43	43		Boeing	275	264	206	4.2
46	42	35		ITT	265	265	250	0
47	61	74	⇑	Intergraph	252	155	91	61.9
48	48	54		Philips Information Systems	250	203	140	23.2
49	51	47		Lanier Business Products	223	194	161	14.8
50	105	n/m		Seagate	222	56	n/m	289.9

⇑ = Vendor moved up in ranking two consecutive years.
n/m = not meaningful n/a = not available n/c = not calculable
** Summary figures for 1982 and 1981 exclude revenues listed as n/a or n/m.*
Alphabetical index to corporations in the Top 100 is on page G42.

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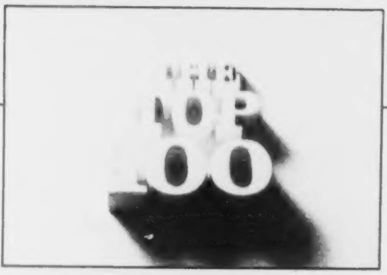

Rank '83	Rank '82	Rank '81			Dp revenues '83	Dp revenues '82	Dp revenues '81	Growth '83/'82
51	65	56		United Telecommunications	222	148	137	50.0
52	50	55		Telex	221	194	142	13.8
53	44	40		Northern Telecom	220	237	222	-7.2
54	46	39		Perkin-Elmer	213	207	226	3.2
55	57	59	⇑	Shared Medical Systems	210	165	131	27.2
56	47	57		Paradyne	210	207	135	1.3
57	53	46		Sanders	207	181	166	14.3
58	60	n/m		NEC Information Systems	200	160	n/a	25.0
59	52	49		Nixdorf Computers	200	186	159	7.5
60	56	50		Informatics General	197	170	150	16.3
61	58	68		M/A Com	196	164	112	19.2
62	49	48		Allied	195	195	160	0
63	60	61		CPT	192	158	123	21.1
64	63	58		General Instrument	191	152	135	26.1
65	59	52		Signal Companies	180	163	147	10.4
66	71	86	⇑	Dysan	178	138	63	28.4
67	70	65		Centronics Data	170	139	116	21.6
68	67	70		Cray Research	169	141	101	20.2
69	85	98	⇑	Televideo Systems	168	98	34	71.2
70	55	51		Schlumberger	167	175	148	-4.5
71	86	100	⇑	Convergent Technologies	163	96	13	69.5
72	69	63		Grumman	157	140	119	12.1
73	74	75	⇑	Quotron	153	120	88	27.2
74	68	53		Wyly	152	140	146	8.9
75	78	71		Dun & Bradstreet	150	110	100	36.4
76	73	72		Martin Marietta	149	122	98	22.5
77	80	78		First Data Resources	148	106	81	40.2
78	88	85		Verbatim	147	91	68	60.3
79	75	66		Reynolds & Reynolds	147	119	115	22.9
80	83	82		Management Science America	145	101	73	43.4
81	66	64		Planning Research	143	146	117	-2.3
82	76	97		NBI	140	119	43	17.5
83	79	69		Gerber Scientific	135	107	101	26.4
84	106	n/m		Continental Telecomm	130	52	n/m	150.0
85	82	83		National Data	128	103	71	24.3
86	84	n/m		Zenith	125	100	n/a	25.0
87	72	89		Exxon	120	130	60	-7.7
88	77	60		Recognition Equipment	117	112	131	4.1
89	n/m	n/m		L.M. Ericsson	115	n/a	n/a	n/c
90	n/m	n/m		Compaq	111	n/m	n/m	n/c
91	81	73		Commerce Clearing House	109	104	91	4.5
92	102	98		Cullinet Software	108	69	36	55.5
93	93	78		Interactive Data	105	82	81	28.0
94	98	95		Decision Data	103	74	50	39.7
95	94	88		Computer Consoles	103	79	60	30.9
96	95	89		Printronix	101	77	60	31.6
97	92	90		Floating Point Systems	100	86	57	15.7
98	103	93		General Datacomm Inds.	98	68	54	43.7
99	97	96		Nashua	97	74	50	30.6
100	101	99		Cipher Data Products	92	70	33	32.4
				Summary	$91,057	$77,999*	$63,923*	

(Continued from page G7)

pulted from virtually nowhere in 1982 to rank 90th. L. M. Ericsson, the Swedish giant that made its presence felt as an OEM in the United States for the first time, is also a notable newcomer. By acquiring Cado and STSC, telecommunications conglomerate Continental Telecomm (Contel) thrust itself into the thick of dp's top performers. General Datacomm, manufacturer of an array of data-communications products, and Cullinet Software, the software house that just missed inclusion on the 1982 list, also moved into the Top 100 this time around.

Leaving aside the extraordinary cases of Compaq and L.M. Ericsson, three corporations—Seagate, Contel, and Commodore—more than doubled their business between 1982 and 1983. That's half the number of revenue-doublers on the 1982 list. Interestingly, three of the Top 100 members boasting doubled revenues in 1982 came from the bottom half of the list, while only one of 1983's members—Contel—did. However, Contel's extraordinary dp growth is attributable solely to acquisitions. Compaq doesn't appear on this year's revenue-growth chart because it recorded no positive revenues in 1982. Of course, one may argue that Compaq's success will prove to be ephem-

(Continued on page G14)

Table 2

Comparing IBM to the Top 100

(Dollars in millions)

	1983 dp revenues	'83/'82 growth rate	1982 dp revenues	'82/'81 growth rate
IBM	$37,367	18.7%	$31,467	25.3%
No. 2 - No. 10	25,408	10.0	23,093	14.2
Top 10	62,775	15.0	54,560	20.4
No. 11 - No. 100	28,282	20.6	23,439	23.7
No. 2 - No. 100	53,690	15.3	46,532	18.8
Top 100	91,057	16.7	77,999	21.4

Table 3

The fast trackers

Top 20 in total dp-revenue-growth rate (Dollars in thousands)

	'83/'82 growth	Dp revenues		'83/'82 growth rate	
		1983	1982	U.S.	Foreign
Seagate	289.9%	$222,020	$56,940	354.7%	60.8%
Continental Telecomm	150.0	130,000	52,000	150.0	0
Commodore Int'l.	130.8	969,339	420,000	257.7	46.2
Tandon	94.2	343,885	177,053	103.0	20.6
Televideo Systems	71.2	168,718	98,530	69.0	78.7
Convergent Technologies	69.5	163,500	96,462	91.6	20.3
Amdahl	68.3	777,700	462,200	54.5	100.3
Apple Computer	63.4	1,084,705	663,800	75.6	31.4
Intergraph	61.9	252,000	155,642	72.4	40.9
Verbatim	60.3	147,378	91,933	81.0	−1.3
Management Assistance	57.9	559,212	354,174	23.4	100.0
Cullinet Software	55.5	108,358	69,691	59.4	36.2
United Telecommunications	50.0	222,000	148,000	52.9	28.2
3M	48.0	330,050	223,000	48.5	46.8
General Datacomm Inds.	43.7	98,492	68,517	55.8	21.7
Management Science America	43.4	145,176	101,224	48.4	27.2
First Data Resources	40.2	148,600	106,000	40.2	40.0
Decision Data	39.7	103,829	74,319	38.6	44.4
Dun & Bradstreet	36.4	150,000	110,000	0	36.4
Tandem Computers	36.1	450,516	330,949	38.6	30.4

Compaq is not listed as a "fast tracker" because a growth rate is not calculable. See Table 6 for Compaq's growth in absolute dollars.

(Continued from page G10)

eral as IBM revs up its own portable, the Portable Personal Computer. Compaq is alone among PC-compatible vendors on the Top 100 list.

IBM increased its dp revenues by 18.7 percent in 1983, down from its 25.3 percent increase the previous year. On the other hand, the premier dp corporation captured more of the total dp-revenue pie in 1983 than it had in 1982—41 percent, up from 40.3 percent. (See Table 2.) For the second year in a row, IBM increased its market share, a trend that is likely to continue. The days when Big Blue would tolerate a slow but certain erosion of its market share appear to be over. About 93 percent of IBM's revenues now come from dp, up from 90 percent in 1982 and 87 percent the year before that. The other 99 vendors still managed a highly respectable 15.3 percent year-to-year gain.

In 1983, the Top 10 corporations accounted for 68.9 percent of the Top 100's total revenue from dp. That was down slightly from the 69.9 percent they garnered in 1982. Unlike IBM, the Top 10 as a unit has accounted for an ever smaller portion of the revenue pie each year for the last five years. The Top 10 continues to grow at a slower pace than the Top 100 as a whole—its rate was 20.4 percent in 1982 and 15 percent last year.

Membership in the Top 10 has remained stable for two years, except for Wang's leapfrog over Honeywell into the eighth rank. Honeywell dropped one notch to the ninth position. Five members of the Top 10 are primarily vendors of mainframes: IBM, Burroughs, NCR, Sperry, and Honeywell. Three—Digital Equipment Corp. (DEC), Hewlett-Packard, and Wang—derived the bulk of their dp revenues from minicomputers. The two remaining firms, Control Data and Xerox, achieved their exalted status primarily as OEMs. (Xerox' revenues from its Diablo Systems and Shugart operations exceed its revenues from its own office systems.) Of course, it could be argued that IBM is in a class by itself, deriving whopping revenues from sales of mainframes, as well as minis and microcomputers.

Table 4

The Bottom 20

in revenue-growth rate

	'83/'82 dp growth rate			
	Total	U.S.	Foreign	'83 rank
Storage Technology	−16.5%	−16.5%	−16.5%	16
Raytheon	−10.1	5.4	−56.5	42
Warner Communications	−9.4	−9.2	−10.0	44
Exxon	−7.7	−7.7	0	87
Northern Telecom	−7.2	0	−7.2	53
General Electric	−5.9	−4.2	−10.0	18
Harris	−5.0	−4.8	−6.2	41
Schlumberger	−4.5	−1.4	−16.9	70
Tymshare	−2.8	0	−2.8	43
Planning Research	−2.3	−2.2	−6.5	81
Honeywell	−1.1	.9	−6.6	9
Texas Instruments	−1.0	−10.8	47.6	20
Sperry	−.1	3.1	−4.6	6
Allied	0	0	0	62
ITT	0	0	0	46
Tektronix	.7	.3	1.0	37
Triumph-Adler	.9	2.3	−.7	40
Paradyne	1.3	1.3	1.4	56
Gould	2.8	2.8	2.8	38
Perkin-Elmer	3.2	−1.4	11.7	54

Industry-wide expansion during 1983 pushed more Top 100 corporations over the $200 million plateau. Fifty-nine attained at least $200 million in revenues last year, up from 48 in 1982. In addition, all but three of 1983's Top 100 achieved more than $100 million in dp revenues. Apple and TRW joined the billion-dollar club in 1983, bringing the number of Top 100 companies with dp revenues of over $1 billion to 12, up from 11 in 1982. Storage Technology, after a horrendous year, fell from this exclusive club.

> "The Top 100's gains are even more impressive in light of the disappointing first-half results many reported."

The movers and the shaken

Which dp stars were the prime movers last year? Aside from Compaq and Ericsson (neither of which appeared the 1982 list), OEMs captured the lion's share of spots on the list of companies with the 20 best rates of revenue growth (Table 3). Four OEM corporations, up from two the previous year, occupy spots on the Top 20 list in revenue-growth rate. They are: Seagate, Tandon, Televideo, and Convergent Technologies. Personal-computer vendors captured only two places on this list, down from six in 1982. This is probably evidence of the consolidation underway in the micro industry.

In terms of big moves up the Top 100 roster, for the second year in a row, Tandon led the pack, jumping 18 places to No. 36. Televideo, Convergent Technologies, United Telecomm, Intergraph, and Commodore International also performed well, leaping upward 16, 15, 14, 14, and 13 places, respectively. None of these gains matches the phenomenal growth of some of 1982's high-flyers, but they were impressive in a year of relative stability. Most of the Top 100 vendors hovered near their places on the 1982 list, or remained unchanged. Apple, which moved up eight places, also deserves to be singled out. Indeed, Apple and Commodore made advances near the top of the list, where a single upward step may represent more than $50 million in revenue.

On the other hand, 13 companies actually saw their dp revenues decline during 1983, up from six in 1982. The corporations known as "the Bunch" (Burroughs; Univac, now known as Sperry; NCR; Control Data; and Honeywell) fared slightly better in 1983 than they did in 1982, when all but Burroughs appeared on the listing of the 20 poorest performers (see Table 4). This year, Honeywell and Sperry are the only Bunch members included on the Bottom 20 list, and Honeywell registered fine operating profits. The Bunch companies continue to lose share of the Top 100 revenue pie to IBM, however. Their slice of the total was trimmed to 16.5 percent last year from 18.5 percent in 1982.

> "For the first time, IBM's revenues from personal-computer sales surpassed those of Apple Computer."

Other low-fliers were Texas Instruments, which pulled out of the home-computer business after suffering huge losses, and Warner Communications, which continues to lose on its home-computer line. Sperry, Honeywell, ITT, and Triumph-Adler made the Bottom 20 for the fourth straight year. Storage Technology caps this list of unfortunates, having lost revenues at the rate of 16.5 percent. Warner's 9.4 percent loss is particularly tragic, considering that two years ago this vendor's dp operations exploded at the rate of 475 percent.

Big Blue thunders

In terms of dp revenues gained (Table 6), IBM again increased its treasure trove by a sum greater than all of No. 2 DEC's revenues. IBM is accustomed to pulling off this amazing feat—it has for five years running. Last year, IBM's revenue gain surpassed the total gain of the remaining Top 100 members. This year, however, IBM's $5.9 billion missed that achievement by about $800 million.

IBM announced several major products last year. The 4381 provided an air-cooled upgrade for 4341 users who previously had no alternative but to make the expensive move to water-cooled systems. The most significant announcements were the XT/370 and the 3270 PC, two personal computers

Table 5

Market-segment analysis *of the Top 100 vendors in the dp industry*

(Revenue dollars in millions)

	1983 dp revenues	1982 dp revenues	Change '83/'82
Mainframes (over $250,000)	$21,990	$19,643	11.9%
Minicomputers ($15,000-$250,000)	12,034	10,633	13.2
Microcomputers (under $15,000)	6,055	3,026	100.1
Word processing	3,072	2,472	24.3
Total Top 100 systems revenues	$43,151	$35,774	20.6%
Computer-aided design/manufacturing	$1,559	$1,299	20.0%
OEM peripherals	6,351	5,285	20.2
End-user peripherals	8,621	8,660	−.5
Data-communications hardware	2,700	2,051	31.6
Software	5,586	4,658	19.9
Services	8,482	7,735	9.7
Media	1,094	641	70.7
Maintenance	12,700	11,493	10.5
Other dp revenues	813	403	101.7
Total Top 100 support revenues	$47,906	$42,225	13.5%
Total Top 100 dp revenues	$91,057	$77,999	16.7%

designed for integration with IBM mainframe systems. These two products won't generate big-volume sales for Big Blue, but they are important because they expand the IBM Personal Computer line. Ultimately, the PC will become the base product of IBM's low-end line. Soon, IBM is expected to announce a token-passing local-area network that will wrap the entire IBM line of products for the office into interactive systems.

Mainframe sales on top

Following a long-standing trend, mainframe suppliers dominated the Top 100 in revenues broken down by product type (Table 5). After a surprising surge in 1982, however, growth in mainframe revenues returned to its historic rate of about 12 percent. Sales of minis, while growing faster than sales of mainframes, advanced at a slower rate last year than in 1982. An anticipated upswing in the minicomputer market materialized, but too late to have an effect on the yearlong-performance figures.

Excluding the catchall category of "other dp revenues," the sale of microcomputers registered the fastest growth. Led by IBM and Commodore, micro sales accelerated at a rate of 100.1 percent, more than 15 percent faster than 1982's rapid growth rate. This rate of increase is particularly remarkable in light of the hemorrhage-like losses at Warner and Texas Instruments. Sales of OEM peripherals, buoyed by rosy economic conditions, grew 20.2 percent. Media, a new category in the market-segment breakdown this year, experienced tremendous growth, at 70.7 percent, a reflection of dp vendors' expectations for solid demand during the coming months.

Systems revenues, including those generated by the sale or lease of mainframes, minis, micros, and word processors, came to $43.15 billion in 1983, up 20.6 percent from the $35.77 billion grossed the previous year. Sales of systems accounted for 47.4 percent of total dp revenues. Interestingly, the annual growth rate of systems sales has remained steady in nominal terms for the past five years, never deviating more than a point from 20 percent. The growth rate of support-products revenues has been far more cyclical in recent years.

> "Hardware manufacturers are finding themselves forced to rely on the clever designs of software creators."

All this good news was somewhat counterbalanced by the first *decline* in any product category in the short history of this study. End-user-peripheral sales dropped half a percent in 1983, dragged down primarily by Storage Technology.

Table 6

Top 20 in dp-revenue gain

(Dollars in thousands)

	Gain '83	Gain '82	'83/'82 growth rate
IBM	$5,899,800	$6,356,600	18.7%
DEC	807,823	432,400	20.1
Commodore Int'l.	549,339	244,000	130.8
Wang Labs.	470,700	312,987	35.6
Apple Computer	420,905	263,085	63.4
Amdahl	315,500	19,400	68.3
Hewlett-Packard	250,000	393,000	11.0
Burroughs	229,000	1,331,500	6.0
Tandy (Radio Shack)	220,100	265,000	30.4
Control Data	206,800	180,700	6.3
Management Assistance	205,038	5,106	57.9
NCR	202,000	124,000	7.1
TRW	190,000	-30,000	23.0
Xerox	172,000	178,300	16.4
Tandon	166,832	106,636	94.2
Seagate	165,080	56,940	289.9
Electronic Data Systems	138,974	75,001	25.0
Tandem Computers	119,567	88,477	36.1
L.M. Ericsson	115,000	n/m	n/m
Compaq	111,000	n/m	n/m

n/m = not meaningful

IBM: Master of profitability

IBM continues to reap the vast bulk of the profit harvest in dp. Big Blue earned an estimated $8.19 billion in operating income from dp sales in 1983, up 13 percent from the estimated $7.25 billion earned during the previous year. Thus, IBM earned more than 69 percent of the profits garnered by the Top 100, an increase over last year's 63 percent share. IBM's profitability is even more impressive considering that its share of the total dp market stands at 41 percent.

On the other hand, IBM fell from second to fifth place on the list ranking corporations by their dp operating margins (Table 7). Big Blue lost

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a little more than a percentage point—21.9 percent, down from 23 percent. This year's finish on the operating-profit-margin listing suggests that the trimmings spurred by the last recession had a salutary effect on other parts of the industry. Quotron, Cray, Shared Medical Systems, and Telex—traditionally strong contenders in this category—passed the Armonk, NY-based giant with operating margins of 27.9 percent, 25.6 percent, 24.4 percent, and 23.6 percent, respectively. The big personal-computer vendors are noticeably absent from the Top 20 performers on the dp-operating-margins ranking. Apple and Tandy Corp. (manufacturer of the Radio Shack line) made the 1982 list. But as competition intensified last year, the margins of most micro vendors shrank. Commodore, No. 12 on the latest ranking, is the only exception.

Because of a combination of high profitability and large absolute profits, IBM's results skew the industry-average figures, making data processing seem to be more profitable than it is for most of the industry's corporations. For the 82 Top 100 members that make up the basis for this statistic, the average operating margin was 9.3 percent. If weighted, the average profit margin becomes 13 percent, a clear indication of how IBM distorts the Top 100's profitability picture.

Recession's legacy

Overall dp employment, measured by 80 reporting members (representing 94 percent of the total revenues) of the Top 100 increased at the very modest rate of 4.6 percent. This rate of increase was significantly slower than the rate of revenue growth for the same corporations, making 1983 the fifth year of increase in dp-employee revenue productivity (Table 8). For the first time in three years, C. Itoh Electronics failed to retain first place in the rankings for dp revenue per dp employee, ceding the top spot to Zenith Data Systems. C. Itoh dropped to second place. Except for C. Itoh, the revenue-per-employee statistic was up across the board among the 10 top finishers in this category—a legacy of the last recession with its big layoffs. Although it did not make the top half of this ranking, IBM revved up its dp-employee productivity to its highest level in five years.

Except in a few isolated cases—the resurgent mainframe vendor Amdahl and perennially healthy Commodore—foreign dp revenues grew at a significantly slower pace in 1983 than in the previous year (Table 11). Many corporations suffered declines in for-

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Table 7

Top 20 by operating margin

(Dollars in thousands)

	Operating income		Operating margin		
	1983	1982	1983	1982	Change
Quotron	$42,881	$27,628	27.9%	22.8%	22.0%
Cray Research	43,398	32,251	25.6	22.8	11.9
Shared Medical Systems	51,424	41,024	24.4	24.7	−1.4
Telex	52,232	35,200	23.6	18.1	30.4
IBM	8,192,370	7,250,450	21.9	23.0	−4.8
Televideo Systems	36,752	25,482	21.8	25.9	−15.8
Intergraph	53,275	24,956	21.1	16.0	31.8
Cullinet Software	22,551	14,897	20.8	21.4	−2.6
Computervision	80,000	67,624	20.0	20.8	−3.8
Floating Point Systems	19,318	15,477	19.3	17.9	7.8
Nashua	18,100	9,400	18.5	12.6	47.4
Commodore Int'l.	173,510	74,000	17.9	17.6	1.6
Hewlett-Packard	430,000	370,000	17.1	16.3	4.7
Computer Consoles	17,610	9,952	17.0	12.6	35.2
Automatic Data Processing	127,000	111,000	15.6	15.6	−.2
Verbatim	22,466	14,946	15.2	16.3	−6.2
Convergent Technologies	24,688	18,207	15.1	18.9	−20.0
Seagate	33,484	10,510	15.1	18.5	−18.3
Schlumberger	24,800	25,000	14.8	14.3	3.9
National Data	18,808	n/a	14.7	n/a	n/m

n/a = not available n/m = not meaningful

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eign revenues. The reasons: the strength of the dollar overseas and the sorry state of most of the world's economies. With the dollar high, foreign currencies are down, encouraging the importation of foreign-manufactured dp products by this country. Imports of computers and computer-related products from the Far East exceeded exports for the first time last year, according to the federal government's 1984 Industrial Outlook report.

The Top 20 in terms of foreign revenues includes four corporations not found in the Top 20 overall: Management Assistance, Prime Computer, Tektronix, and Computervision. (Foreign-owned corporations like Ericsson and Nixdorf are represented in this analysis only by their United States operations.)

IBM's share of foreign dp revenues remained at its 1982 level of 49.3 percent, while the share of foreign dp revenues going to companies in the Bottom 50 continued its five-year history of contraction, sinking to a low of 2.4 percent in 1983. IBM's market share within the United States alone jumped to 36 percent last year, from 34 percent.

As product life cycles are shortened, leased equipment becomes a burden for a vendor that is also trying to sell products. During the past five years, companies have reduced the percentage of their revenues generated via leases. In doing so, they've left the lease market to corporations that specialize in rentals. Leases accounted for 17.6 percent of the Top 100's total dp revenues last year, down from 19.3 percent the previous year and 22 percent in 1981. Mainframe vendors, which historically lead the dp industry in lease revenues, show the steepest decline in this revenue category. Indeed, during the past four years, mainframe-lease revenues declined more sharply than those of the entire industry.

> "Conglomerates with dp operations had a rough time in 1983; many had flat dp earnings and some lost money."

The most rapidly growing members of the Top 100 continue to rely on revenues generated by outright sales. Conversely, the slowest growing corporations derived the largest portion of their revenues from services and maintenance.

Order rates for mainframes increased in 1983, with the greatest strength in the second half of the year. This trend will probably continue this year. More orders translate into higher shipments and improved revenues, improving prospects for many old-line mainframe manufacturers. All is not well, however. These corporations are attempting to diversify by moving into other, high-growth markets. But as they do, they will find themselves facing high, profit-sapping start-up costs. Moreover, diversifying corporations are moving into an already crowded marketplace. IBM dominates almost all aspects of data processing and at least one competitor occupies each market niche. There's not much room for new competitor companies to move into.

The plug-compatible mainframe makers had a good year. Both Amdahl and National Semiconductor are in the process of achieving compatibility with IBM's Extended Architecture (XA) and should begin shipping their IBM equivalents in quantity this year. They will probably be back in trouble by next year, however, as IBM's product line continues to evolve.

Table 8

Revenue-per-employee ranking *(Dollars in thousands)*

		Revenue per employee	Total employees	Operating income per employee	'83 dp revenue
1	Zenith	$333.3	375	$22.9	$125,000
2	C. Itoh	316.1	1,140	n/a	360,300
3	NEC Information Systems	266.7	750	n/a	200,025
4	Apple Computer	236.7	4,582	20.5	1,084,705
5	Compaq	203.3	546	21.8	111,000
6	Nashua	195.4	500	36.2	97,700
7	Televideo Systems	194.6	867	42.4	168,718
8	Amdahl	194.4	4,000	n/a	777,700
9	Convergent Technologies	186.2	878	28.1	163,500
10	Motorola	182.3	2,820	−1.8	514,000
14	IBM	113.4	329,600	24.8	37,367,000

n/a = not available

As noted, the anticipated recovery of the minicomputer industry did not materialize until the last quarter of 1983. The mini manufacturers were severely pinched by IBM's aggressive price cutting and growing competition from micros. This year, however, many of these companies will benefit from cyclical growth as a result of increases in capital spending. They'll also benefit from the increasing use of minis to link and enhance personal computers.

IBM routs micro competitors

IBM solidified its position as the dominant personal-computer vendor in 1983. After several years of domination of this segment, Apple Computer took a back seat to Big Blue last year. DEC's attempt to ship what looked like a blockbuster personal computer foundered, and Warner Communications' Atari division made almost every blunder in the book on the way to gigantic losses. Only Commodore has emerged unscathed and poised for strong growth in its targeted home-computer market this year. The shakeout of micro makers will probably continue this year, with Apple emerging as the only dominant alternative to IBM and the manufacturers of PC-compatible machines, like Compaq. The Japanese presence in personal computers could significantly expand this year.

The home-computer boom is by no means about to end, and the potential revenues for enterprising vendors are huge. About 10 percent of American households have a personal computer. By the end of the decade, that figure may reach 80 percent. IBM has yet to demonstrate that it has clout in the home market, and neither Commodore, Apple, nor Tandy has the dominance IBM enjoys among business users. Moreover, the shakeout has severely cut the supply of personal computers for the home, and the situation isn't expected to stabilize until next year at the earliest. Results from this year should indicate which vendors among the Top 100 are capitalizing on the potential of the home-computer market.

Last year was a year of watching and waiting in the office-systems business. However, positive trends are apparent in the year's results. The big office-automation vendors have finally begun to respond to user demands for integrated applications and information access. IBM, in particular, took major steps toward the integration of its office hardware (witness the release of Document Interchange Architecture/Document Content Architecture), and competitors in this segment of the industry have accepted IBM's role as standard-setter for the office. These trends will continue next year.

This year has all the earmarks of being a big one for the Top 100: The economy is strong and major corporate customers have increased capital spending. Some industry segments will find this climate more fruitful than others. For example, vendors of computer-aided-design and -manufacturing (CAD/CAM) systems felt the effects of the last recession last year. CAD/CAM's growth rate declined to 20 percent from 25.3 percent in 1982. However, as corporate capital spending rises, CAD/CAM suppliers should return to their formerly high-flying growth rates—perhaps as high as 40 percent this year.

> "Industry-wide expansion during 1983 pushed 59 Top 100 corporations over the plateau of $200 million in revenues."

Peripherals and media should also continue to grow briskly in 1984, fueled by the growth of the personal-

Table 9

Top 20 by dp operating income

(Dollars in thousands)

	1983	1982	Change
IBM	$8,192,370	$7,250,450	13.0%
Hewlett-Packard	430,000	370,000	16.2
NCR	386,554	398,022	−2.9
Burroughs	361,500	248,100	45.7
DEC	338,100	668,078	−49.4
Sperry	278,300	233,700	19.1
Wang Labs.	251,300	185,000	35.8
Control Data	234,800	242,000	−3.0
Commodore Int'l.	173,510	74,000	134.5
Honeywell	130,800	79,800	63.9
Automatic Data Processing	127,000	111,000	14.4
Apple Computer	94,042	120,042	−21.7
Electronic Data Systems	87,646	73,975	18.5
Computervision	80,000	67,624	18.3
TRW	69,500	69,000	.7
Tandem Computers	55,012	40,991	34.2
Intergraph	53,275	24,956	113.5
Telex	52,232	35,200	48.4
Shared Medical Systems	51,424	41,024	25.4
Prime Computer	50,965	68,628	−25.7

computer segment. Supplies have begun to catch up to demand, however, creating far more treacherous conditions for vendors.

For both software and service vendors, the outlook for 1984 is universally bright. The key technology trends that have spurred the growth of these segments—declining hardware prices, a shortage of skilled programmers, and increasing end-user computing—should continue to accelerate. Combined with the strength of the economy, these factors will ensure solid performances from the software and services segments of the industry.

The fortunes of software vendors are being enhanced by the effects of the computer's penetration of the workplace and the home. As they learn more about computers, users are losing patience with the arcane ways of hardware "techies" who are concerned more with technical elegance and efficiency than with ease of use. Thus, hardware manufacturers are finding themselves forced to rely more and more on the clever designs of software creators for new, easier-to-use applications.

A specialist's game

Data processing is evolving into a specialist's game. The large conglomerates with dp operations had a bad time of it in 1983; many had flat dp earnings and some lost money (Table 12). After explosive growth in 1982, corporations whose dp operations account for less than 25 percent of their total revenues grew at the anemic rate of 4 percent. The poor track record of the conglomerates—combined with dp's potential sensitivity to trends in the economy—has halted the acquisition of dp subsidiaries by non-dp corporations. Some of these conglomerates have even begun to shed their dp operations.

Many telecommunications vendors are an exception to this rule, but they are special cases. Deregulation is having a profound effect on the structure of the dp and telecommunications industries. Technology is being allowed to follow its natural course toward a blurring of the border be-

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> "Big office-automation vendors have finally begun to respond to user demands for integrated applications."

Table 10

Top 20 in U.S. dp revenues

(Dollars in thousands)

		1983 U.S. revenues	Percent of total dp revenues	1982 U.S. revenues	Change '83/'82	Top 100 rank
1	IBM	$21,546,042	57.7%	$16,363,152	31.7%	1
2	DEC	3,040,898	63.0	2,411,400	26.1	2
3	Control Data	2,434,100	69.4	2,235,800	8.9	4
4	Burroughs	1,997,400	49.5	1,823,300	9.5	3
5	Sperry	1,686,500	60.2	1,635,900	3.1	6
6	NCR	1,640,000	53.9	1,410,000	16.3	5
7	Hewlett-Packard	1,510,000	60.0	1,170,720	29.0	7
8	Wang Labs	1,285,700	71.7	913,525	40.7	8
9	Honeywell	1,235,300	74.1	1,224,000	.9	9
10	Xerox	1,048,100	85.7	918,800	14.1	10
11	TRW	1,015,000	100.0	825,000	23.0	12
12	Apple Computer	843,704	77.8	480,396	75.6	11
13	Tandy (Radio Shack)	744,000	78.7	583,000	27.6	14
14	Automatic Data Processing	742,300	91.0	648,000	14.6	17
15	Electronic Data Systems	659,874	95.0	536,006	23.1	22
16	Storage Technology	639,000	74.3	765,000	−16.5	16
17	Computer Sciences	602,845	83.9	562,804	7.1	21
18	Commodore Int'l.	600,867	62.0	168,000	257.7	13
19	Data General	581,200	67.0	528,700	9.9	15
20	General Electric	575,000	71.9	600,000	−4.2	18
	Summary	$44,427,830		$35,803,503	24.1%	

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tween dp and communications. Companies that have grown up on one side of the border have been forced to diversify their product offerings, either through internal development (AT&T's approach), acquisitions (like Contel), or partnerships and other special relationships with other vendors (like the IBM and Rolm deal).

It is still too early to make predictions, but both industries are certainly changing. AT&T, in particular, stands at the crossroads. Saddled by a corporate culture shaped during decades of government regulation, the telecommunications giant has yet to prove its ability to prosper or survive the rigors of competition. So far, its actions have not demonstrated that AT&T has a firm grasp of the realities of the marketplace. However, there's no question that AT&T's financial might and reputation for quality are big pluses. If AT&T can rid itself of internal inertia, it may become a formidable competitor for IBM.

The Japanese penetration of the American market proceeds apace. For two years, the United States has had a trade deficit with Japan in the shipment of computers and related products. In 1983, the gap was so large it accounted for the United States' overall computer-trade deficit with the Far East. However, fears that the Japanese are grabbing the lead in advanced computer technology may be exaggerated. In particular, reports that Japanese researchers have equaled the performance of the Cray XMP supercomputer could turn out to be a red herring. In general, the Japanese probably won't be serious competitors in mainframes under their own names until the end of the decade. The Japanese vendors simply don't have the support and service networks necessary to sustain a drive to grab a big chunk of the American market.

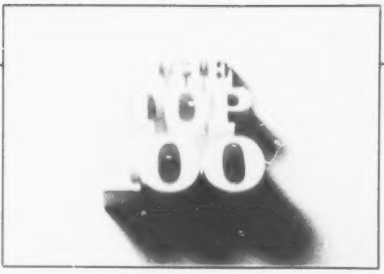
The low end of the market is quite another matter. The Japanese corporations' ability to supply low-cost, high-quality products will soon propel "Japan Inc." into the forefront of the personal-computer and peripherals markets. Japanese vendors will be formidable competitors for Ameri-

> "Except in isolated cases, foreign dp revenues grew at a much slower pace in 1983 than in the previous year."

Table 11

Top 20 in foreign dp revenues *(Dollars in thousands)*

		1983 foreign revenues	Percent of total dp revenue	1982 foreign revenues	Change '83/'82	Top 100 rank
1	IBM	$15,821,358	42.3%	$15,104,448	4.7%	1
2	Burroughs	2,041,100	50.5	1,986,200	2.8	3
3	DEC	1,785,925	37.0	1,607,600	11.1	2
4	NCR	1,400,000	46.1	1,428,000	−2.0	5
5	Sperry	1,113,100	39.8	1,167,000	−4.6	6
6	Control Data	1,073,800	30.6	1,065,300	.8	4
7	Hewlett-Packard	1,008,000	40.0	1,097,280	−8.1	7
8	Wang Labs.	506,500	28.3	407,975	24.1	8
9	Honeywell	430,800	25.9	461,000	−6.6	9
10	Commodore Int'l.	368,472	38.0	252,000	46.2	13
11	Management Assistance	318,751	57.0	159,379	100.0	23
12	Data General	285,910	33.0	275,120	3.9	15
13	Amdahl	277,700	35.7	138,630	100.3	19
14	Apple Computer	241,001	22.2	183,404	31.4	11
15	General Electric	225,000	28.1	250,000	−10.0	18
16	Storage Technology	221,390	25.7	265,000	−16.5	16
17	Prime Computer	208,414	40.4	188,458	10.6	26
18	Tektronix	203,072	60.0	201,000	1.0	37
19	Tandy (Radio Shack)	201,100	21.3	142,000	41.6	14
20	Computervision	196,000	49.0	161,200	21.6	31
	Summary	$27,927,393		$26,540,994	5.2%	



can vendors weakened by the struggle with IBM.

IBM, of course, will continue to dominate the dp business for the foreseeable future. The overall distribution of revenues by company demonstrates that the computer market is an oligarchy, with the top few companies generating most of the revenues. Even with IBM removed, only a few companies control the majority of industry revenues. It's unlikely that this distribution of power and wealth will change. IBM calls the tune for the industry and all other vendors dance. The only exceptions are suppliers that established a presence in many sites early in the development of a particular industry segment or those that have been successful in specialized markets.

In general, coexistence with IBM is a fact of life for the rest of the Top 100. That may mean no more than supporting IBM communications protocols or as much as offering plug-compatible products. Each strategy has its attendant rewards and risks, not the least of which is IBM's decision to exploit a market niche previously left to a smaller vendor. The dp industry is becoming littered with the corpses of small ambitious companies that took on IBM one-on-one.

Nonetheless, data processing has traditionally been fertile ground for small companies, and that's unlikely to change in the future. Indeed, signs point to the emergence of a second tier of vendors below the Top 100. Led by independent software houses, the roster of vendors in this tier has begun to grow larger. In the future, consideration of their annual performances and results will be important to understanding the state of the dp industry's health and wealth. □

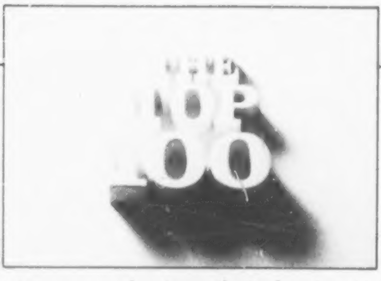
Gartner Group defines dp revenues as those revenues generated by the sale, lease, or service of dp hardware

Table 12

Top 100 vendors with less than 25 percent of revenues from dp *(Dollars in thousands)*

		Percentage dp in '83	Primary sector	'83 dp revenues	Top 100 rank
1	Exxon	.1%	Word processing	$120,000	87
2	ITT	1.3	OEM peripherals	265,000	46
3	Allied	1.9	Minicomputers	195,000	62
4	Boeing	2.4	Service	275,000	45
5	Signal Companies	3.0	End-user peripherals	180,000	65
6	General Electric	3.0	Service	800,000	18
7	Schlumberger	3.0	CAD/CAM	167,100	70
8	Martin Marietta	3.8	Service	149,400	76
9	3M	4.7	Media	330,050	39
10	Raytheon	5.1	End-user peripherals	302,000	42
11	Continental Telecomm	6.2	Microcomputers	130,000	84
12	McDonnell Douglas	6.5	Service	542,500	25
13	Grumman	7.0	Service	157,000	72
14	Warner Communications	8.2	Microcomputers	281,000	44
15	Northern Telecom	8.3	Minicomputers	220,000	53
16	United Telecommunications	8.8	End-user peripherals	222,000	51
17	Zenith	9.2	Microcomputers	125,000	86
18	Dun & Bradstreet	9.9	Service	150,000	75
19	Motorola	11.9	Data-comm hardware	514,000	27
20	Xerox	14.5	OEM peripherals	1,222,300	10
21	Texas Instruments	16.1	Minicomputers	739,000	20
22	Nashua	17.3	OEM peripherals	97,700	99
23	TRW	18.5	Software	1,015,000	12
24	Perkin-Elmer	20.1	Minicomputers	213,933	54
25	General Instrument	21.5	Service	191,851	64
26	Harris	22.4	End-user peripherals	327,600	41

or software or the provision of a dp service. Revenues are counted for the 12 months ending Dec. 31, 1983. Included are all systems hardware, such as mainframes, minis, micros above the sub-$100 class, word-processing and other office-systems hardware, OEM and end-user peripheral gear, data-communications equipment such as modems and multiplexers, disk and tape media, CAD/CAM systems, software, and maintenance.



Specifically excluded are services related to common-carrier communications, electric and electronic typewriters, electronic cash registers, instrumentation, semiconductors, board-level computers, printed circuit boards, automatic test gear, PABX-type switching equipment, forms, and paper, as well as companies engaged primarily in leasing (to avoid double-counting IBM's revenues), and revenues from retail operations like Computerland.

Gartner Group maintains a database of these statistics that is periodically restated; thus, figures for earlier years reported in 1983's listings may not precisely agree with previously published figures. In particular, comparisons with 1982 figures may differ from previously published data. Gartner Group also restates the revenues of vendors that are not on a December fiscal year; in the event a corporation has an unusual fiscal year (ending in November, for example), the four quarters of data ending closest to December are used. Where companies are closely held or are conglomerates, Gartner Group offers its best estimate of the applicable revenues. Vendors that should be included may be missed.

Gartner Group will publish a detailed compilation of these data in early summer. This book will contain more than 100 cross-section charts and analyses of the structure of the dp industry by company, product, and financial concept. For a brochure on this reference work, circle No. 798 on the Reader-Service Card at the back of the June issue of Computer Decisions *or contact William Cappelli, Gartner Group, 72 Cummings Point Rd., Stamford, CT 06902, (203) 964-0096.*

Index to corporations in the Top 100

Company	Rank
Allied	62
Amdahl	19
Apple Computer	11
Automatic Data Processing	17
Boeing	45
Burroughs	3
Centronics Data	67
Cipher Data Products	100
C. Itoh	34
Commerce Clearing House	91
Commodore Int'l	13
Compaq	90
Computer Consoles	95
Computer Sciences	21
Computervision	31
Continental Telecomm	84
Control Data	4
Convergent Technologies	71
CPT	63
Cray Research	68
Cullinet Software	92
Data General	15
Datapoint	24
Dataproducts	35
DEC	2
Decision Data	94
Dun & Bradstreet	75
Dysan	66
Electronic Data Systems	22
Exxon	87
First Data Resources	77
Floating Point Systems	97
General Datacomm Inds	98
General Electric	18
General Instrument	64
Gerber Scientific	83
Gould	38
Grumman	72
Harris	41
Hewlett-Packard	7
Honeywell	9
IBM	1
Informatics General	60
Interactive Data	93
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AUGUST 1984

THE MANAGEMENT MAGAZINE OF COMPUTING

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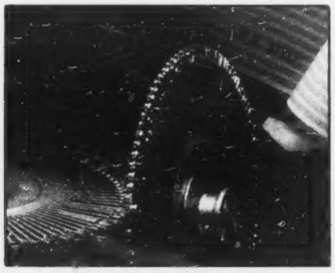

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COVER PHOTO: Ted Hardin

by Randy J. Goldfield and David Culver

OFFICE AUTOMATION

OA for small shops

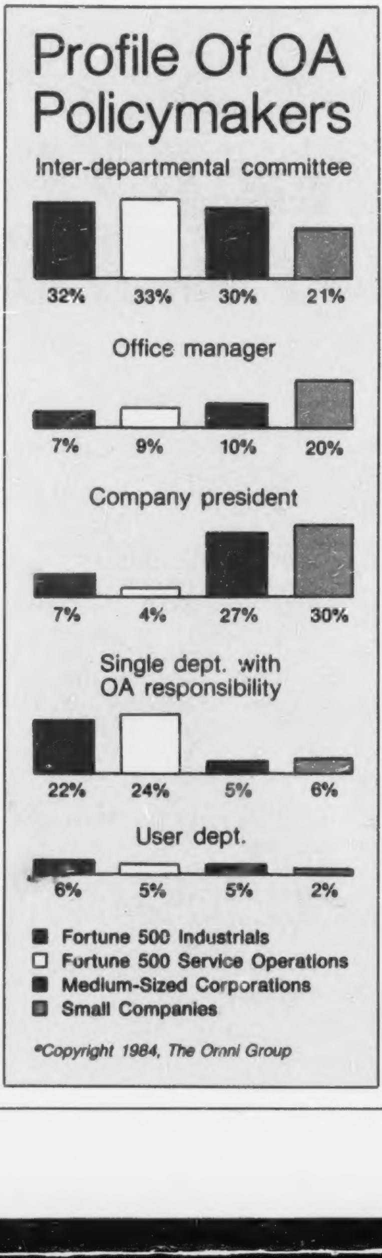
Office automation is not just for large operations. Small businesses all over the country are making good use of available technology to cut costs and improve the functioning of their offices. Small branches and divisions of giant corporations can learn from these progressive small businesses.

Apples are important to 61-year-old Melvin Brown in two ways. First, his business ships 600,000 cases of them a year. Second, he and his employees depend on six Apple II micros to help them keep shipments moving to market.

Brown is president and general manager of Wells & Wade Fruits Co., an apple grower and distributor. Brown and six employees handle all the company's administrative chores. An additional 60 to 70 employees work in packing, and 12 to 50 seasonal workers make up the rest of Wells & Wade's workforce.

"We used to be hard-pressed to handle the workload here without more clerical help," says Brown. All that's changed now. Three years ago, after taking a computer course at a local community college, Brown decided to install a sophisticated Omninet local area network from Corvus Systems Inc., San Jose, CA. Brown is more than satisfied with his move to microcomputers. "Now all our bills go out the same day the order does," he says.

Wells & Wade does its accounting, invoicing, and payroll on the system, which uses a combination of off-the-shelf software and the Versaform forms-generator program. Everyone in the office has a micro, including Brown, and even the auditor who does the books uses the system. "At first I considered microcomputers as a stop-gap solution, just to get us started," Brown says. "Now, with the right software and sufficient memory capacity, we're able to do the job."



Profile Of OA Policymakers

Copyright 1984, The Omni Group

Richard Sundin, president of Sundin Associates, a six-employee market-research house in Boston, not only introduced the use of microcomputers in his business, but uses one himself. Today, Sundin Associates uses three Apple IIes and an Apple II Plus. In four years, the company has doubled its business volume, but hasn't had to increase its staff. Sundin has cut the time spent on accounting and tax preparation from up to 30 hours a month to eight hours. At the same time, he has gained greater control over his business. Sundin's success with his microcomputer is partly due to his engineering background. "I had a leg up on this technology, but there is much more help for small-business people now than when I started," he says. Sundin believes that the small-business executive has to come to grips with the technology. "What happens if the person who runs the micro leaves? Then you're stuck," he says. "Like everything else in a small operation, you have to know how to do it yourself."

In Fairfax, VA, Wolpoff & Abramson, a law firm, saves $7,000 a month in printing costs, thanks to an in-house computerized printing system. Wolpoff & Abramson generates a high volume of documents to support its debt-collection efforts. The pre-printed forms required by law cost the firm $10,000 a month until it installed a Xerox 5700 printing system a little more than a year ago. Donald Miller, the firm's one-man data-processing department, oversees the system's operation. Today, when a new form must be presented in court, he gets a sample form from the court, goes through a font catalog, and, in a few minutes, designs the new form on the electronic printer. In an average day, he will print out 4,500 sheets on the Xerox 5700, which is linked to the firm's Burroughs mainframe. "Our forms include names and addresses that are automatically pulled from the computer's database. Circuit-court judges will not accept computer printouts," Miller says. "Before this system was installed, we sometimes had to throw out a year's supply of forms simply because a court decided to change a form without giving us advance notice," he adds.

Miller has programmed the printer to work automatically. Aside from setting up a new form now and then (the firm uses 65 forms for six court systems), all he has to do is load paper stock and empty the output hopper.

Wolpoff & Abramson also sends out almost 600 computer-generated letters a day, an increase of 50 percent over last year. They are highly legible and may include signatures and logos from any of the various jurisdictions of district, small claims, and circuit courts the firm serves in Maryland, Virginia, and Washington.

A small revolution

The information revolution has spawned a new group of systems developers: entrepreneurs and small-business owners who, with only an understanding of their business requirements, are successfully establishing OA systems by trial and error. "It wasn't easy getting it right, but we managed to," says Melvin Brown of his experimental approach. "I'm quite proud of learning the hard way and doing so well," says Richard Sundin.

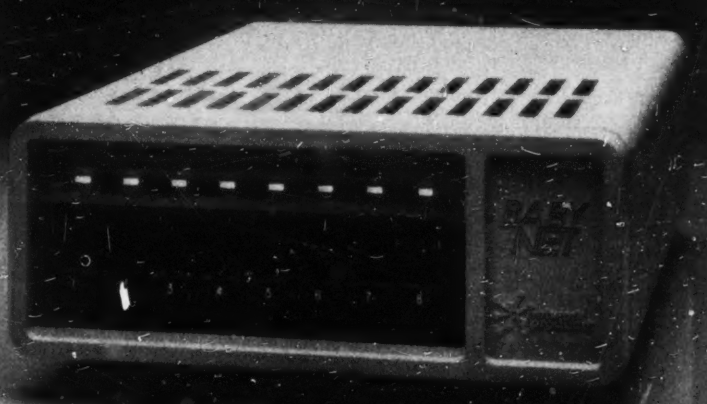
Clearly, small businesses are no longer limiting their OA systems to an electronic typewriter or a dedicated word processor. More frequently, they are taking a high-tech approach to lightening their administrative burdens. And they do it without large, dedicated MIS staffs or costly consultants.

In a recent Omni Group study, small businesses reported that while office automation committees and office managers take part in forming company policy on office automation, most frequently the president is the final decision-maker (30 percent of the time). This is in contrast to the practice in large corporations, where committees set policy approximately 32 percent of the time, and a single department (usually MIS) is responsible about 22 percent of the time (see chart).

Despite their inexperience, these small businesses make installing OA look easy. Perhaps this is due to their willingness to experiment and make firm decisions. Managers of smaller divisions of large corporations can learn from their experience. ☐

Randy J. Goldfield, founder and president of the Omni Group, an OA consultancy based in New York, is a frequent contributor to this column. Her co-author, David Culver, is a senior consultant with the firm.

BABYNET



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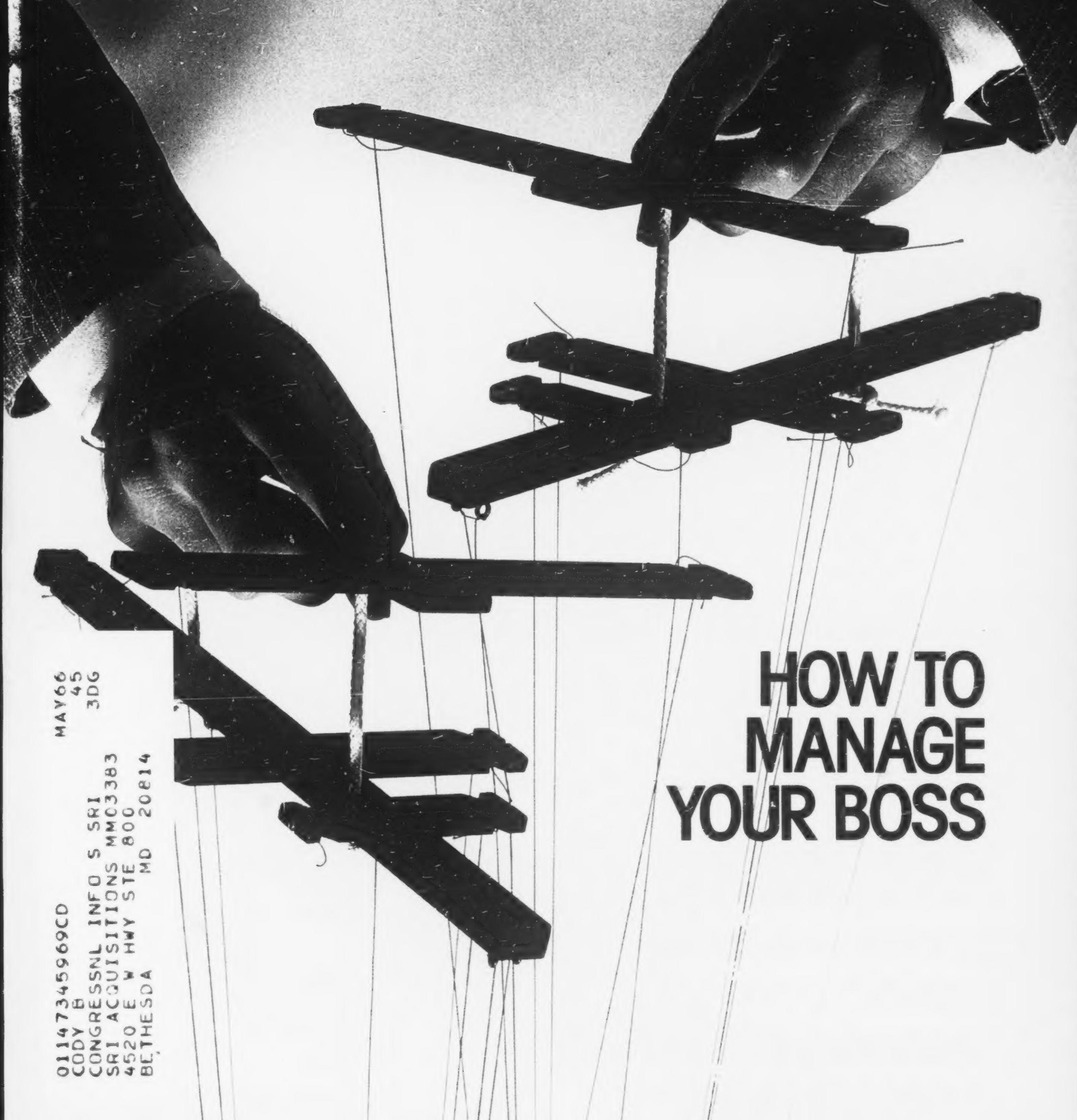

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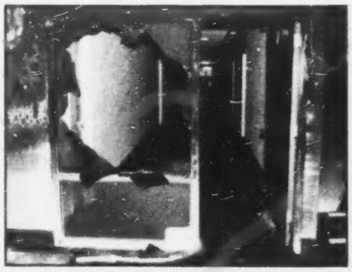

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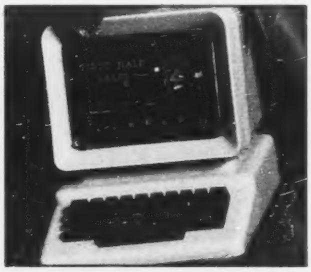

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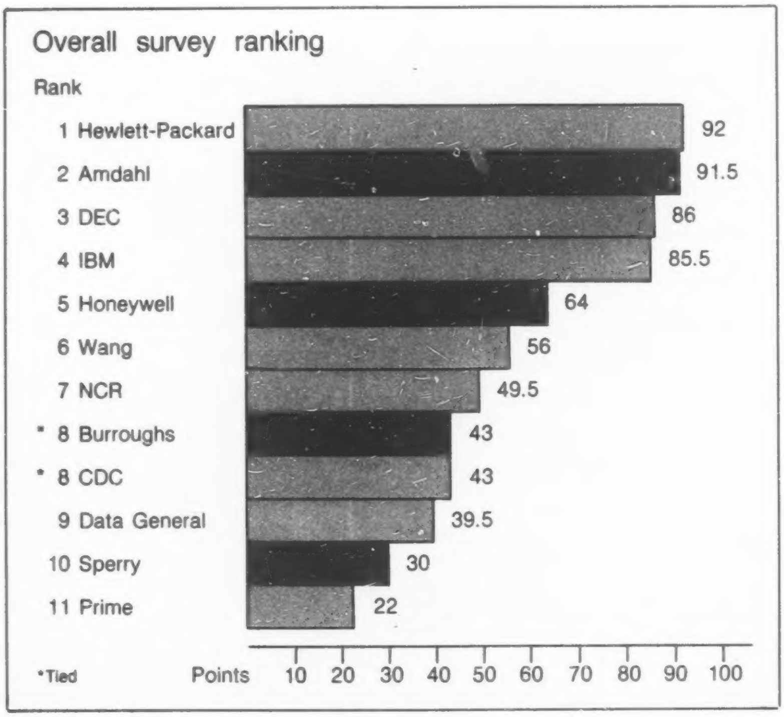
COVER PHOTO: Ted Hardin

news & comment

Users rate HP number one

Look who's number one. Hewlett-Packard was rated the best of 12 large-systems manufacturers in a recent survey of about 2,800 users in industry and government. Amdahl ranked a close second. Digital Equipment Corp. (DEC) came in third, and IBM placed fourth. Bringing up the rear among the majors were Data General, Sperry, and Prime.



The survey, by Stuart Kirkland, a Bellevue, WA, market-research house, evaluated user attitudes toward 12 large-system vendors. The overall ranking was based on the quality of each manufacturer's hardware, software, and service. Users were asked to assess the manufacturers on a scale of "very satisfied" to "very dissatisfied" in each category. Hardware was rated for reliability and ease of use. Service was rated for response time, parts availability, and effectiveness of repair. Software was evaluated in seven categories: systems, applications, utilities, ease of use, documentation, service, and quality. Each manufacturer received a general "good-will" rating as a vendor to do business with.

A summary of the survey's findings on each of the 12 manufacturers follows:

Hewlett-Packard Co. (Palo Alto, CA) ranked number one in service. HP excelled in parts availability and ranked first in software service and support. It was consistently rated near the top in reliability and hardware ease of use, service response time, effectiveness of repair, systems software, documentation, and as a manufacturer to do business with. "Users of Hewlett-Packard's products are impressed with their reliability," according to the study. "However, they complain that its service could be faster and its products less expensive."

Users had only good things to say about **Amdahl Corp.** (Sunnyvale, CA). The company was rated as the manufacturer with the best hardware and as the best company to do business with. "Amdahl's hardware is considered to be very reliable and is the easiest to use. Its service is very good in all respects, and it ranked first in speed of service response."

Digital Equipment Corp. of Maynard, MA, consistently received high scores in every category. DEC's strongest point is its software: It ranked first in systems software, applications programs, documentation, and overall software quality. It ranked fourth in the hardware and service categories.

IBM (Armonk, NY) ranked fifth in the overall hardware ranking. However, IBM scored first in hardware reliability, and its service ranked second after HP. It also ranked first in effectiveness of repair. Moreover, unlike the other manufacturers, IBM's performance in these categories did not vary in different parts of the nation. Although it was third in overall software quality, it scored in the middle ranges for systems software, utilities, applications programs, and ease of use.

The survey revealed a significant drop in satisfaction between the top four manufacturers and the other eight. **Honeywell Information Systems Inc.** (Waltham, MA) consistently ranked in the middle ranges in hardware, software, and service. It received above-average marks for ease of software use and below-average marks in parts availability and software quality. *(News continued on page 18)*

news & comment

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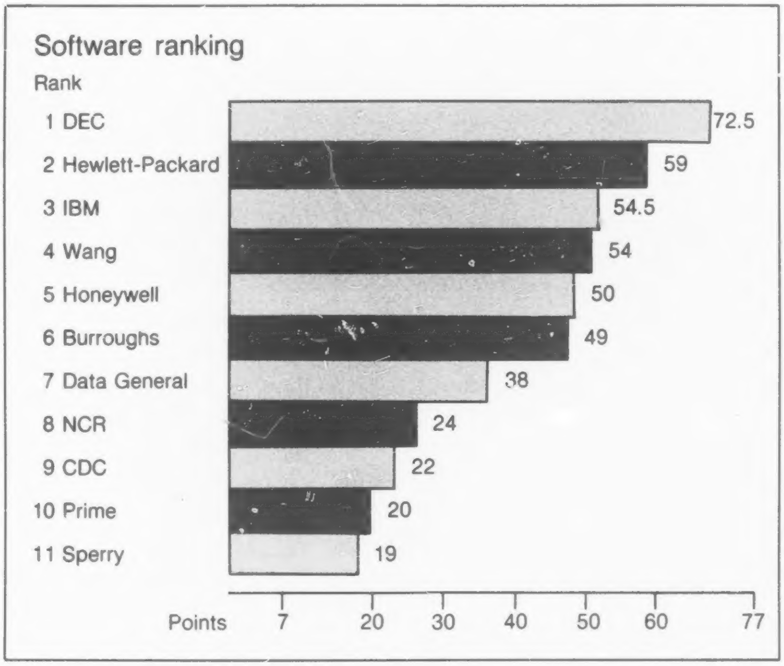
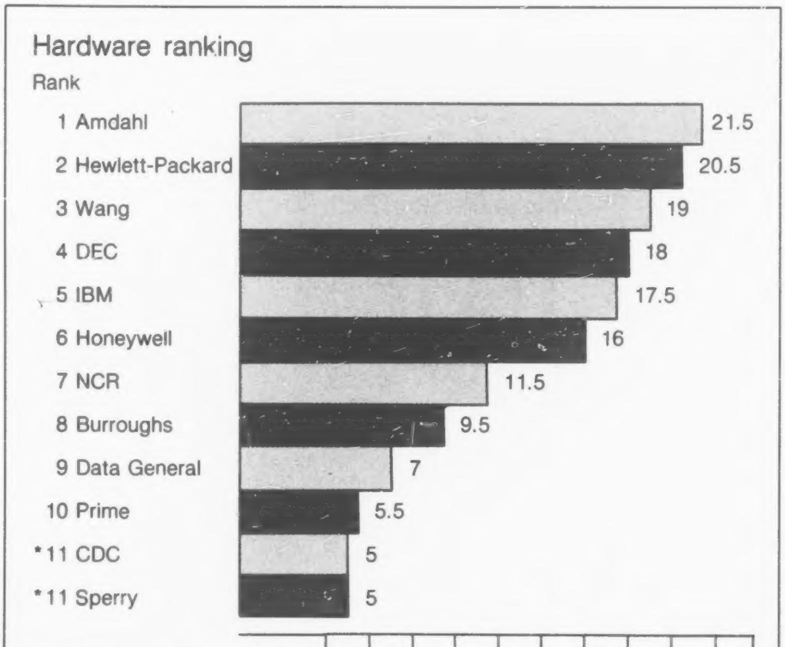
There was good and bad news for **Wang Laboratories Inc.** (Lowell, MA). Wang was rated number one in software ease of use and tied for third in both hardware reliability and hardware ease of use. However, it ranked 10th in service and eighth as a company to do business with.


Software ranking


Hardware ranking

Most of the ratings for **NCR Corp.** (Dayton, OH) were average, but it was rated below average in parts availability and received below-average marks in five software areas: systems, utilities, applications, service, and software quality.

Burroughs Corp. (Detroit, MI) ranked last in service. Its hardware was rated as adequate. Burroughs' software received good marks in the systems, utilities, and ease-of-use categories, but fared poorly in documentation and service.

Control Data Corp. (Minneapolis, MN) was rated below average in seven of 13 categories and average for the rest. Control Data's below-average rating in hardware ease of use tied it for last in the overall hardware rating. Its software utilities and documentation are weak, according to respondents, and it came in ninth in the overall software rating. CDC's strongest showing was in hardware service.

Data General Corp. (Westboro, MA) scored last as a vendor to do business with. Respondents consider its hardware adequate but hard to use, and its service inconsistent. Its strongest overall showing was in the software category, where it ranked seventh. "The strongest point for Data General is its applications software, the only category where it scores above average. Most of the other manufacturers perform poorly in this category," according to the survey.

Sperry Corp. (Blue Bell, PA) rated average or below average in all categories. Its hardware scored the lowest in reliability of all 12 manufacturers. Its service was rated ninth, and it ranked in the bottom third of the 12 manufacturers as a company to do business with.

Prime Computer Inc. (Natick, MA) also didn't achieve a single above-average rating. It was rated 11th in service and as a vendor to do business with. Its software ranked below average in all categories except ease of use, in which it earned an average rating.

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news & comment

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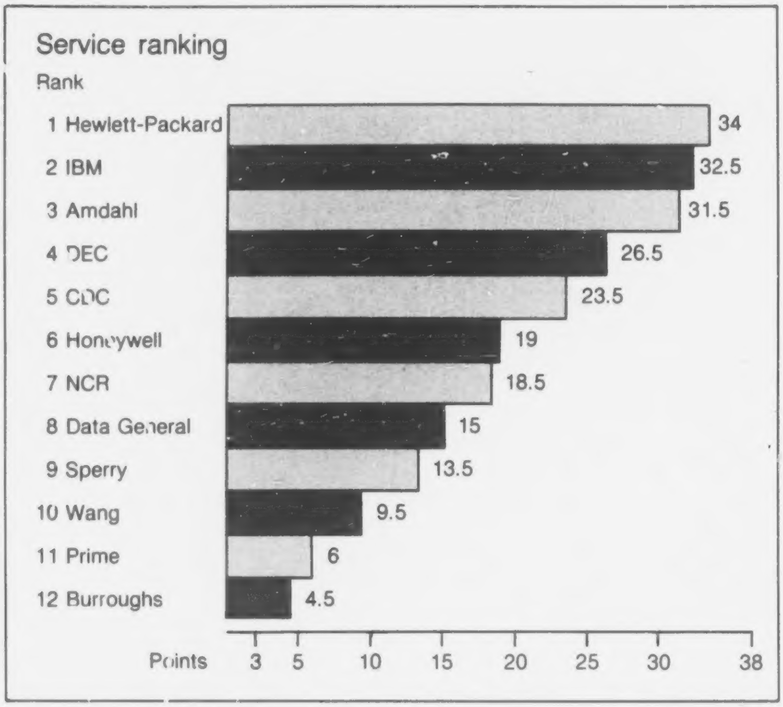

If you are dissatisfied with the documentation and service of the software you are buying, you are not alone, according to the survey. "Poor documentation is an industry-wide scourge," it concludes. Every manufacturer, with the exception of DEC and HP, scored low in software documentation. In the category of software service and support, only DEC, IBM, and HP performed acceptably.

The survey was conducted via telephone interviews in late 1983 and 1984. A copy of "Computer Users, An Opinion Survey" is available for $125 from Stuart Kirkland, 10636 Main St. #117, Bellevue, WA 98004, (206) 455-0952.

Planner: "Politics" behind firing

A former capacity planner for the Bank of America claims he saved millions of dollars for his ex-employer by tuning up its mainframe performance-measurement system, but was fired because his recommendations ruffled the feathers of the bank's capacity-management staff.

The capacity planner, Clifford J. Johnson, 35, of San Francisco, has been locked in a four-year legal struggle with the nation's second largest bank in the California state courts. He wants the bank to pay him damages for improperly firing him and defaming his reputation.

The Bank of America denies the charges and claims Johnson only saved it a fraction of the money he says he saved them. An attorney for the bank, Mark Ross of San Francisco, refused to comment on Johnson's allegations, other than to say they were untrue.

Johnson, hired in 1977 as an operations-research expert, claims he was fired after making several suggestions on how the mainframes in the bank's San Francisco data center could run more efficiently and safely. He says these suggestions were resented by the systems-programming department, which was responsible for capacity planning. A political battle ensued, ending with Johnson's forced termination in 1980.

Johnson claims his firing was malicious. The bank gave bad references about him to prospective employers, he says, and that helped keep him unemployed for 18 months. Now he works as manager of capacity planning at Stanford University in Palo Alto, CA.

Johnson filed the lawsuit in 1980. The suit was twice thrown out because he didn't state how the bank's acts were illegal, Ross said. The third complaint has been pending since 1981.

In the lawsuit and a subsequent interview, Johnson alleges the following. He was hired in June 1977 (his salary at termination was about $30,000) as capacity planner for a part of the dp department involved in new applications. However, Johnson says his boss ordered him to secretly evaluate the capacity-measurement techniques used in another section of the dp department responsible for mainline production applications. The bank's systems-programming department, which oversaw performance measurement in that corner of the dp department, resented his recommendations once they found out about them.

The animosity between the entrenched systems programmers and Johnson became apparent to upper dp management and the personnel department. It prompted correspondence in which Johnson repeated his criticisms of the system. The dp manager, initially appreciating Johnson's cost-cutting work, eventually sided with the systems programmers. Finally in February 1980, after Johnson had refused to resign, the bank fired him. He filed the lawsuit two months later.

Johnson doesn't blame his coworkers. "On one hand, you have a man [Johnson's boss] who pushed the rules to save the company money, but how can you blame him for trying to

(News continued on page 24)